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Established 1914

CHEMICAL INDUSTRIES

Vol. 41 Oct. 1937 No. 4

Published monthly and entered as 2d class matter Dec. 22, 1934, at the Post Office at New Haven, Conn., under the Act of March 3, 1879. Subscription, domestic and Canada, $3 a year; foreign, $4.

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THAT'S A LOT OF BULK
WHEN Hezro Davis says he has loaded more than a billion pounds of bulk soda ash in the years he has worked at Saltville, he is making no idle boast. He is simply stating a fact—a fact of which he is justly proud. Davis is proud of this record not just because it tells how well he has been doing his part to insure the safe arrival of bulk shipments of Mathieson Soda Ash. He is proud of what it tells about his company, too. For how could such volume be possible, Davis reasons, had not Mathieson been doing an outstanding job of producing good soda ash and giving good service to customers?
The MATHIESON ALKALI WORKS (Inc.), 60 East 42nd St., New York, N.Y.
Mathieson Chemicals
SODA ASH . . . CAUSTIC SODA . . . BICARBONATE OF SODA . . . LIQUID CHLORINE . . . BLEACHING POWDER . . . HTH AND HTH-15 . . . AMMONIA, ANHYDROUS AND AQUA . . . PH-PLUS (FUSED ALKALI) SULPHUR CHLORIDE . . . CCH (INDUSTRIAL HYPOCHLORITE) . . . DRY ICE (CARBON DIOXIDE ICE)

The Reader Writes:—

Don't Blame the College

Like yourself, I was impressed, on reading the intensely interesting opinions on "Why Chemists Get Fired," by the fact that so many had so often the same or similar criticism. It is patently unfair to blame the colleges for deficiencies in character and personality that are traceable to home influence and the spirit of these troubled times, and I find the easy-going, the world-owes-me-a-living, lack of mental discipline habits all a sign of the youth of today, rather than peculiarly of the recent technical graduates. Any very rigid selection contra these defects would leave us without enough young men for replacements.

Likewise, deficiencies in English training goes back to home and high school, though I admit the entrance requirements to college ought to be in this respect very much more exacting. Again, however, it is not fair to blame the colleges who certainly cannot be reasonably expected to teach spelling and English grammar to candidates for a bachelor's degree.

Nevertheless, I agree that there has been too little emphasis upon chemistry and too much time spent on courses in sewage disposal, gas analysis, plant design, etc., etc. Most of these have been instituted, I suspect, in response to the demand from parents, students, and men in the industry itself for "practical work." The results are baneful, since we find chemists who do not really master chemistry and engineers who are really only draftsmen or mechanics. Teach the principles in college: learn the practice in industry, was a favorite saying of an old physics professor of mine, and it is sound and successful as my own experience has taught me.

St. Paul, Minn. PAUL POLSON.

The Greeks Had a Name for It, Too

We understand that you offer a monthly disinfecting service to cover the extermination of flies, roaches, mice, etc.

Kindly advise your charges for this service together with full information as to just what it covers.

Mt. Morris, N. Y. N. STANLEY LINCOLN, M.D.,
Supt. Mt. Morris Hospital.

Wants a Program

S. B. Hancock, in a letter you published in the September number, makes a most sensible proposal which I think should be clearly stated and repeated often.

What is needed in this country is a constructive American program.

It is nothing to criticize without presenting an alternative suggestion. If criticism alone were effective, the present President of the United States would have been impeached for failure to his oath to uphold the Constitution; James Farley would have been behind bars for corrupt practices in the last election; the brain trusties would have been exiled to Russia. In the face of criticism, supported by facts, they flourish like the bay tree and with all the national resources of patronage and propaganda they are not, in my opinion, going to be defeated by their own mistakes. To hope for this is apparently the only real plan of the opposition.

There are two big groups which have a real stake in this country: agriculture and business. Farmers and businessmen should get together. They have common interests in sound finances, in economic freedom of opportunity, in social liberty, in all that true democracy means. Our American system has developed the highest standard of living and the greatest social security this well known human race has ever enjoyed. It works. It is not perfect. It can be made to work better than in the past.

Let us admit the faults, study them, work out a real constructive plan to meet conditions in 1937, and really support a real program. Do that and the leadership will come to the fore that will save us from the muddling, autocratic, opportunist schemes that are being foisted upon us today. If we do not, we are bound straight for a totalitarian government, call it by what name you wish, that is not democratic and not American.

Houston, Texas. ROBERT T. BURTON.

"From Cover to Cover"

CHEMICAL INDUSTRIES is one of the magazines that comes to our laboratory which we read from cover to cover.

Worcester, Mass. R. C. CHARRON.
U. S. Envelope Co.

From a "Want Ad"

We have a letter from Cape Chamber of Industries, Cape Town, South Africa, which indicates that the Chamber is mentioning our interest in new products in its monthly journal *Industrial and Commercial South Africa.*

It is probable that replies will be sent to your office and we request that you make special note of replies from foreign countries to ensure that such replies reach us as our box number may be omitted from them.

New York City. S. B. PENICK & Co.

Who Will Answer This One?

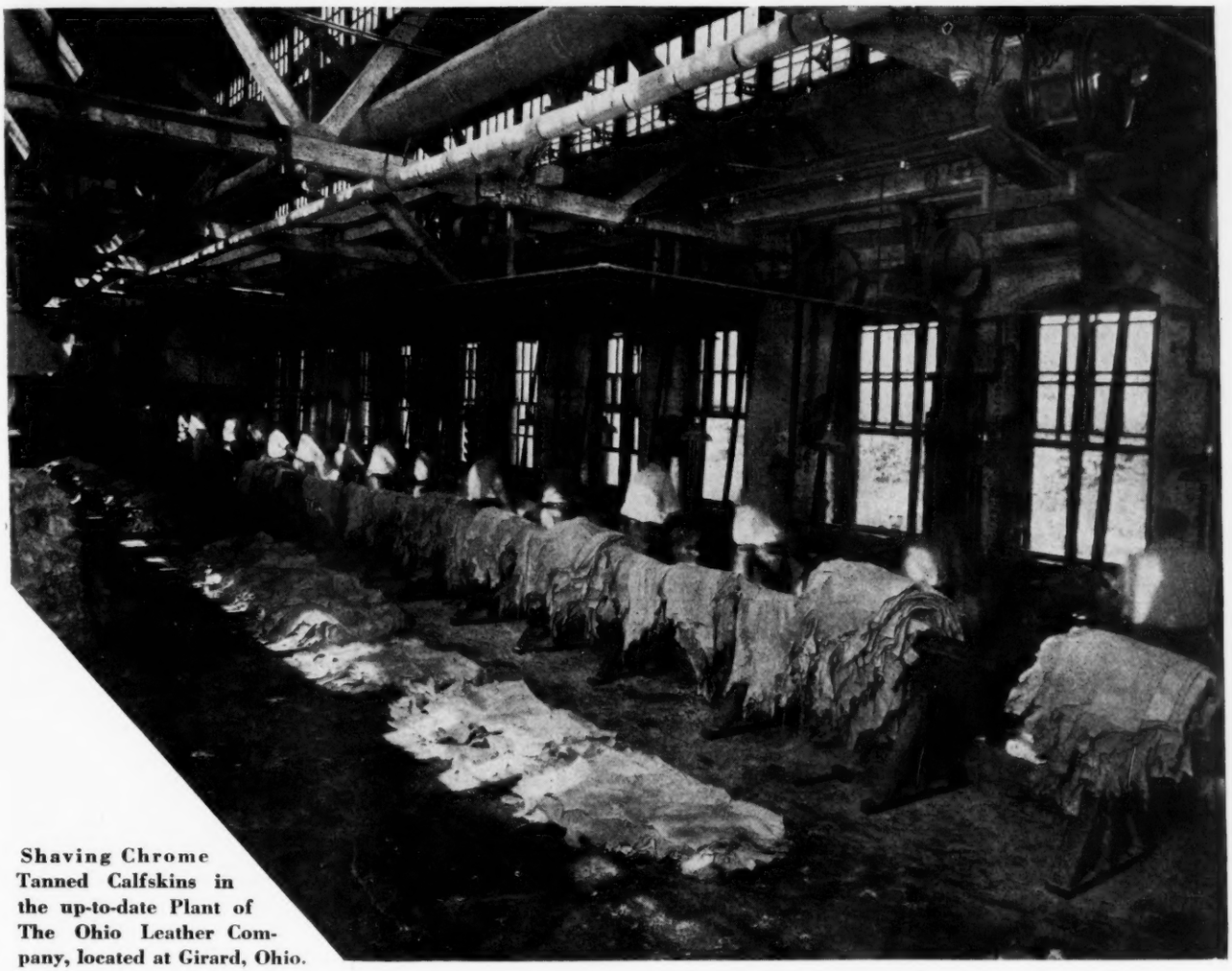
What puzzles me is why the men who are actually running the American business machine show so little spirit of their boasted independence that they acquiesce so passively to a system that makes them dependent upon the whim of absentee owners of the corporation for which they work. There have been a number of notable examples right in chemical industries within recent years where the owners (stockholders) of a company have sold it into a consolidation. Avowedly part of the object, certainly on the part of the purchaser-corporation, has been to effect economies with the result that many thoroughly honest, capable, loyal employees of the company that is consolidated are, as they say in Europe, "liquidated."

Now I can understand both the theory and the practice of such a system from the viewpoint of the capitalistic owners, but I cannot comprehend either the logic or the justification of such dismissals from faithful, well rendered service for the employee. Without considering the personal problems of an individual case, it would appear that a business system which puts any and all employees' economic security in such jeopardy is at its roots rotten.

Why do the executives, the salesmen, the technicians support a system that holds as its first principle a condition that makes the basis of their employment so intolerable?

New York. JACOB STONE.

L E A T H E R



Shaving Chrome Tanned Calfskins in the up-to-date Plant of The Ohio Leather Company, located at Girard, Ohio.

The tanning of leather was revolutionized when chrome tannage was introduced. Today leather tanning is the largest single use for Bichromate of Soda. Chrome tanning is cheaper and quicker than the older vegetable tans and chrome tanned leather resists wear because, after dipping in a chrome solution, each fibre becomes armor plated with a soft, tough compound of hydrated Chromic Oxide and the collagen of the fibre. Mutual Bichromate of Soda enjoys an enviable reputation for high quality throughout the tanning industry.

BICHROMATE OF SODA **CHROMIC ACID**
BICHROMATE OF POTASH **OXALIC ACID**

MUTUAL CHEMICAL COMPANY

Mutual Chemical Company of America - - - 270 Madison Avenue - - - New York City

HAMMERING OUT NEW MARKETS

Step by step industry is hammering out new markets for its products. Salesmanship gets most of the credit, but product improvement is of equal, if not greater, importance as a selling force. Through more efficient methods better quality merchandise is con-

ALL ALONG THE LINE

stantly being made available to a greater number of people.

Chemicals are star behind-the-line salesmen. Through chemicals, finer textiles, leather, paper, paints, inks, metals and a host of other products are being produced to sell at prices that broaden the base of merchandising activity. This is industry's best guarantee of tomorrow's income.

Examples of specially produced Cyanamid materials that are helping manufacturers give greater value can be found in the column at the right. Through the development of such products Cyanamid builds business by helping its customers build business.

AMERICAN CYANAMID & CHEMICAL CORPORATION

30 ROCKEFELLER PLAZA • NEW YORK, N. Y.

****AEROCASE CASE HARDENING COMPOUNDS.** These compounds are used as a liquid bath process for case hardening and heat treating low and medium carbon alloy steels. The process is flexible and can be used for case hardening, annealing, reheating and heat treating. Liquid baths prevent objectionable scale formation. If your product requires a hard surface which is tough and resistant to wear, AEROCASE Case Hardening Compounds will do the job quicker and cheaper.

SUCCINIC ACID—$COOH \cdot (CH_2)_2 \cdot COOH$—White granular crystals, over 99% pure. Of particular interest to manufacturers of esters and synthetic resins. Produced commercially and available for prompt deliveries.

****DECERESOL WETTING AGENTS—** For the Textile Industry—new, powerful surface tension depressants. These products have remarkable wetting and penetrating properties and are invaluable aids in all types of textile processing. They speed up scouring and dyeing processes, and are useful as well in carbonizing, fulling and finishing. They form soluble salts with calcium and magnesium and are, therefore, extremely valuable where hard water conditions are encountered.

****TANAK**—In contrast to the vegetable tanning materials, Syntans are used for many purposes because of valuable properties which may not be—and very often are not—a function of the direct tanning value of the material. We are manufacturing a number of TANAK grades for specific purposes, and the value of each product is determined by the advantages derived from its use in the particular operation for which it is intended. We are glad to cooperate with the tanning industry's chemists in establishing analytical methods, particularly for the control of Syntan containing liquors which are used several times.

DYEWOOD & TANNING EXTRACTS Fustic, Hematine, Logwood, Osage Orange, Quercitron Bark, Hypernic, in paste, crystal and solid forms—Sumac (ordinary and stainless), Cutch, Divi Divi, Gambier, Querbracho, Wattle Bark, Myrabolam, Hemlock, Mangrove, in liquid form—Querbracho, Mangrove, Wattle, in crystal and powdered forms.

Watch this column monthly for the announcement of other interesting Cyanamid developments. Technical information on these and other Cyanamid products is available on request.

*Trademark of American Cyanamid & Chemical Corporation denoting synthetic resin of its manufacture

**Trade Mark—Registered U. S. Patent Office

Carbon Tetrachloride

by the quart or the tank-car

Carbon Tetrachloride is supplied by this Company in various sized containers: 8,000 gallon tank-cars; returnable drums holding 60, 120, 700, and 1,400 pounds; non-returnable drums holding 60, 120, and 700 pounds; gallon cans packed 6 to the case; and quart cans packed 12 to the case.

Whether you use it as a cleaning and degreasing agent, as a solvent for extraction purposes, in the manufacture of rubber products, as an intermediate in organic synthesis, or simply as a laboratory reagent—you will find the Carbon Tetrachloride supplied by this Company to be of dependable purity.

Our highly specialized technical service is always available to help our customers with difficult problems.

A few of the Pennsylvania Salt Manufacturing Company Products:

LIQUID CHLORINE

CAUSTIC SODA

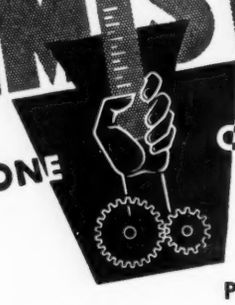
KRYOLITH
(Natural Greenland Cryolite)

BLEACHING POWDER
(Chloride of Lime)

ANHYDROUS SODIUM ORTHOSILICATE

CARBON BISULPHIDE

CHEMISTRY



THE KEYSTONE OF INDUSTRY

PENNSYLVANIA SALT MANUFACTURING COMPANY
ESTABLISHED 1850
WIDENER BLDG., PHILADELPHIA, PA.
OFFICES: NEW YORK · CHICAGO · ST. LOUIS · PITTSBURGH · TACOMA · WYANDOTTE

PENNSYLVANIA SALT *Chemicals*

ADVERTISING PAGES REMOVED

CHEMICAL INDUSTRIES

The Chemical Business Magazine

Consulting Editorial Board
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Williams Haynes, Publisher and Editor; A. M. Corbet, and W. J. Murphy, Associate Editors; W. F. George, Advertising Manager; D. O. Haynes, Subscription Manager; J. H. Burt, Production Manager.

Heaven Helps Those—

FORCES inimical to a solid economic recovery continue to be generated in Washington and begin to exert hostile influence upon the state of general business. The federal budget is still badly out of balance, and with relief expenditures still as great as at the height of unemployment, there is no immediate prospect of our Government living within its means. The labor policy is still biased. Nothing was learned from the Blue Eagle and the Pig Pogrom, and experiments in hour-and-wage control and in farm acreage restriction are being vigorously continued. These three only typify a vast number of flighty, fidgety activities in finance, in labor, in economic control which are being pushed ahead in every direction with apparently no serious thought whatsoever save their political effects no further removed than 1940.

Now at best purely political reasoning is uncertain and near-sighted when applied to broad economic problems. When it provides a motive for repudiating almost every sound business principle and many old rules of moral conduct, it becomes so patently unwise and so openly selfish that only blind partisanship or strong self-interest can support it.

Mr. Roosevelt's policies are bringing him logically into this position; and while there is more talk of more emotional issues, it will be upon economic foundations that he will stand or fall. He can only secure enough votes by self interest, and he can only be checked during the remainder of his second term if an increasing number of citizens are convinced that they will have greater opportunity and more security under a Government administered in the traditional American way.

We print on another page a letter from a reader emphasizing the futility of criticizing the policies or deeds of the Administration without proposing definite, constructive alternatives. This has, of course, been the consistent weakness of Roosevelt's opposition and the chief reason for its ineffectiveness. Nothing is so needed, just at this psychological time, as purposeful opposition of these policies admittedly hostile to the business community, and businessmen have the best reason—self defense—to fight this battle.

A High-test Job for the T.V.A.

Comparison of the formulas sold by our pioneer manufacturer of mixed fertilizers (whose life story is told in this issue) with the plant-food content of mixtures on the market today shows plainly that the fertilizer industry has consistently led farm practice in the use of concentrated fertilizer materials. As far back as twenty-five years ago, the advertising of that pioneering company was chiefly devoted to justifying the higher cost, but better results, of high-test fertilizer.

There has been definite progress in the past quarter century; but the old problem is still with us, and the fertilizer consumption by grades reported for Texas, Louisiana, and Arkansas for the current season confirms this strikingly. Taking the perfectly comparable formulas of 4-8-4, 6-12-6, and 10-20-10, consumption respectively in these three states was 59,336.96, 4,282.65, and 296 tons. Superphosphate sales show the same rapidly declining demand for the higher test materials. In the three states there was sold of 18 per cent. a total of 9,798.45 tons; of 20 per cent., 4,465.67; of 32 per cent., 525; of 45 per cent., 59.75 tons.

These sales of superphosphate deserve the thoughtful study of the T. V. A. They disprove the repeated insinuation that the American fertilizer industry has not provided high-test superphosphate in adequate quantities for farm consumption. They indicate very plainly that the education of the farmer to the use of high-test phosphates is a task well worthy of all of their super-propaganda powers.

Union or Profession

Open affiliation of the Federation of Architects, Engineers, Chemists and Technicians with the C.I.O., announced with a flourish last month, surprises nobody familiar with the New York representatives of this hybrid group of young radicals. Doubtless they gain substantial financial backing. They have lost the last shred of pretense, which they vociferously maintained, to any professional status.

Their manifesto, calling a convention under C.I.O. auspices in Detroit, makes good reading for the officers of the A.C.S., the "Chemical Engineers," and the Institute of Chemists. By toning down the bright red glow of its language, it would make a sound creed for any of our professional societies—if the pledge of a defensive and offensive alliance between C.I.O. organizations in the plant and the laboratory were omitted. That single, little "if" is a big, bitter pill for the competent professional man to swallow.

The Use of Words

When research and production executives complain that young technicians cannot "write understandable reports," they voice a criticism that can with equal justice be made of young salesmen, or farmers, or bank clerks. Nor is this failing distinctive of youth, for most of us find it hard to use these mental tools. With pen in hand we are apt to string together words which in their literal meaning mean little indeed. In contradistinction to the commonalty of the nation Franklin D. Roosevelt instinctively writes sentences that mean literally something quite different from what they imply. His Constitution Day speech has two brilliant examples of this beguiling duplicity. He says that the writers of our Constitution repeatedly voted down James Madison's proposal to give the veto power over legislation to the Supreme Court. True; but he certainly does not imply that this proposal was that every bill in Congress should be passed upon by the Court before it could become the law of the land. Again, he said that this government would never take away the liberties of any citizen. Untrue; but he did not imply that in real democracies the rights of any citizen may only be restricted by law. Such use of words is quite as much a misuse as the young technician's statement that "the process is economically unsound because the available water supply exceeds 200 hardness $CaCO_3$."

A Guest Editorial

One of those many good small-city dailies that flourish throughout the land is the *Westerly* (R. I.) *Sun* from which (Sept. 12, 1937) we quote:

> One of the American statesmen who is particularly enjoying himself these days is Secretary of State Cordell Hull, who has been making trade agreements with various nations of the world and so sabotaging the protective tariff which the free traders know full well they could not get rid of by straight out and out proposal in Congress for repeal.
>
> We are living under the new dispensation. One dollar of foreign trade is worth more to the New Deal prophets than nineteen dollars worth of American trade. Of our tremendous production, normally 95 per cent. is absorbed by the American market which is by far the richest market in the world.
>
> The balance of trade was against us for the first six months of this year to the tune of $147,000,000 so that we will be fortunate if the unfavorable balance of the year is not more than $100,000,000.
>
> Counting this together with the money which goes out of the country for lotteries, and to pay dividends and interest to aliens who own American securities, it is believed that Uncle Sam's actual foreign trade deficit for the year will be at least $200,000,000. Then, of course, in addition to buying peon-made goods abroad we are paying our farmers to cut their production so that the alien farmers can raise more farm produce to ship to us. Uncle Sam is a real Santa Claus, believe it or not.

The First Maker of Mixed Fertilizer

James Jay Mapes, His Son and Grandson

NO other pioneer of the American chemical industry lived life with the zest and relish of James J. Mapes. That lusty vigor of mind and body which Plutarch noted as one of the prerequisites of great accomplishment, catapulted him through a dozen diverse chemical careers, so that he was not only the first maker in this country of both superphosphate and complete mixed fertilizers, but also the first chemical engineer to open a consulting office in New York, and the first American manufacturer of a synthetic tanning agent and of Epsom salts from the hydrobisilicate of magnesium. He was moreover, the inventor of important chemical processes and apparatus used in sugar refining, in color making, dyeing distilling, and steel tempering. He introduced practical methods of chemical control into the then-infant industries of daguerreotyping and electrotyping. An analyst of skilled resourcefulness he perfected methods for beer and wine determinations which were for many years standard practice. He was one of our first, and is still remembered as one of our greatest, expert court witnesses. For many years he taught both inorganic and organic chemistry. He originated, and upon the basis of his own practical experience organized, the first courses in agricultural chemistry.

Unsatisfied by activities that would have completely consumed the energies of three or four active men, he was for two years editor of "The American Repository of Arts, Sciences and Manufactures," resigning only to found and edit a magazine of his own, *The Working Farmer*. He bought an outworn farm and transformed it into what became literally the model of the modern Agricultural Experiment Station. He invented an improved sub-soil plough and engaged in the nursery business. He served as the very active officer of a great number of scientific associations. He organized several night schools, forerunners of the Cooper Institute, and was for years a pillar of the society that grew into the American Museum of Natural History. He wrote articles for practically every scientific journal and farm paper of his day and made more than a hundred and fifty public addresses. As a youth of seventeen he delivered a course of lectures on military tactics illustrated by a relief map with moving figures depicting Napoleon's disastrous Moscow campaign, and fifty years later Lincoln called him to Washington to confer with the Union generals on their plans to encompass Richmond.

Not content with all his scientific, agricultural, and industrial pursuits, as a hobby he painted in oils on canvas and miniatures in water colors, and two of his portraits were hung at exhibitions of the National Academy. He was a first class amateur musician and he wrote jolly doggerel verse for the amusement of his friends and family.

Professor Mapes was a famous wit with rare gifts of mimicry and dialect, and in days when dining was a fine art, he was known as an epicure. He dearly loved good company, entertained constantly, and was always in demand as a dinner companion. He was a member of the old New York Club, the St. Nicholas Society, the Sketch Club and others; and among his close friends were Washington Irving, William Cullen Bryant, Horace Greeley, Richard W. Gilder, and Marion Harland from the world of letters; Samuel F. B. Morse, inventor of the telegraph, Frank Forester, the sportsman, John Ericsson, the engineer who built the "Monitor," Professor Tenny of Williams, and from the world of affairs John L. Morton, Charles Ingham, Thomas J. Cummings, Henry Inman, A. B. Durand, and his own cousin, Samuel Waldo.

Till the day of his death James J. Mapes lived with true Elizabethan gusto. Even in the expansive epoch of our history during which he lived he seems quite un-American, displaying rather the versatile talents and catholic tastes typical of the man of the Italian Renais-

Material assistance in writing this article was given by Spencer Mapes who contributed many facts and data. He is a great-grandson of James J. Mapes and is working now on a biography of Mary Mapes Dodge.

sance. He lived well and was even lavish in his hospitality; but his comfortable income came chiefly from his personal services as chemist and consultant and expert witness, as author and editor and lecturer, rather than from his business ventures either as a merchant or a manufacturer. A lesser man would have been dissipated by his multitudinous interests; but so tremendous were his energies and so great his mental resources that James J. Mapes was able during his comparatively short life to carve his name in bold letters within half a dozen niches in our Chemical Hall of Fame.

The Mapes family from whence sprang this original, universal genius was probably of Welsh origin. The Doomsday Book records that one branch owned extensive lands in Herefordshire before the Norman conquest, and an early, distinguished member of the line was Sir Walter de Mapes, scholar, courtier, Archbishop of Oxford, who as court poet collected the popular stories of King Arthur and his Knights of the Round Table, weaving together the legends of their quest for the Holy Grail and creating the character of Sir Galahad.

The first of this ancient family to come to America was John Mapes who landed in 1634 but died without issue so that the American branch is descended from Thomas, one of the seven men who in 1640 under the Rev. John Youngs from New Haven made the first settlement on Long Island at Southold. Here on Thomas Mapes' tract of over three thousand acres the American branch took root and settled down as farmers. They prospered and mutiplied, and twenty men of the family fought in the Revolutionary War.

Professor Mapes' father, Jonas Mapes, was born on Long Island in 1768 and here he was also born, at Maspeth on May 29, 1806. During the War of 1812 his father as major general was in command of all the defense troops in New York area. The family removed to the city, and after the war General Mapes entered business as an importer and merchant tailor. He was shortly elected an alderman, was appointed treasurer of the committee which received General Lafayette in 1824, and accompanied him by his special invitation on his triumphal tour of the country. He was a founder and for many years a director of the Bank of Savings in Bleecker Street and was intimately associated with Governor DeWitt Clinton in the Erie Canal project which was destined to establish firmly the commercial supremacy of New York over its seaboard rivals. Thus the family occupied an important position in the life of the city and the young James was brought up under the most favorable social conditions.

At the tender age of eight the precocious boy showed plainly the bent of his interest towards chemistry when, after being taken to a lecture on the subject, he made illuminating gas in a retort improvised out of a piece of clay pipe. At eleven he was sent down to Hempstead, Long Island, to board with the family of the illustrious English reformer, William Cobbett, and to attend the famous classical school of Dr. Timothy Clowes. This experience left lasting impressions upon the youthful Mapes, for though he was in the main self-educated, particularly in chemistry, nevertheless he owed to Cobbett his life-long interest in agriculture and to Clowes his taste for belles-lettres.

Charles Victor Mapes

While still in his teens he entered the mercantile house of his father; but in 1827 General Mapes died, and the son having attained his majority launched out in business for himself as a cloth merchant. That same year he married—October 10, 1827—Sophia Furman, daughter of the late Judge Garrett Furman, a distinguished member of another old, prominent Long Island family.

James Mapes continued in the mercantile business for the next seven years; but all during this time he was studying and experimenting in chemistry. In 1832 he invented several notable improvements in the methods of refining sugar and subsequently he perfected apparatus for the more efficient extraction of sugar both from cane and from molasses. Having won a substantial reputation as a chemist, he forsook business in 1834 and for the next twelve years supported himself by his consulting and analytical work.

One of his first clients was the New York State Senate which commissioned him to make a series of analyses of beers. During this period of his career he manufactured Epsom salts and produced from this material a chemical tanning agent designed to replace natural hemlock extract. He made a number of important contributions to a wide variety of chemical industrial processes and helped Seth Boyden in the experiments which led to his invention of malleable iron.

As an amateur artist he became much interested in colors and produced several new pigments of exceptional brilliancy and permanence which had never before been available in America. His most remunerative work, however, was as an expert witness in chemical patent litigation. His sound knowledge and wide practical experience enabled him tellingly to marshall and present his facts. His alert intelligence and unfailing composure withstood the most gruelling cross-examination. His good humored wit was a weapon that the ablest lawyers of his day learned ruefully to respect.

Along with his chemical practice, James Mapes served as Professor of Chemistry and Natural Philosophy of the National Academy of Design and later held a similar position in the American Institute of which he was for many years the vice president. In 1844 he was elected president of the Mechanics Institute, and through these organizations he zealously promoted night schools for adult education. He was interested also in natural history and was elected a permanent member of the New York Lyceum and of the National Institute of Washington.

Gradually, however, Professor Mapes' chief interest began to focus more and more upon scientific agriculture. His studies convinced him that "our farming methods are primitive even to the verge of barbarism." Accordingly, he embarked upon a crusade to introduce sub-soil drainage, crop rotation, and the use of chemical fertilizers. The good dirt farmers of his day greeted his theories with hoots and cat-calls, so to convince them that there was something practical to be learned from "book farming," he purchased a wornout farm in the Weequahic section of Newark, New Jersey and set to work to prove theory by practice. This was in 1847, and from thenceforward his life was devoted to this cause.

Charles Halsted Mapes

He took up this herculean labor of overthrowing long established farming habits and conquering farmers' inertia with typical enthusiasm and energy. He established a magazine, *The Working Farmer*. He organized state and county agricultural societies. He went all over the eastern states talking at meetings of farmers. He was the first to advocate a national Department of Agriculture with a Secretary who should be a cabinet officer.

But most important of all, he transformed the poor wornout soil of his Newark farm into highly productive acres. He grew both vegetables and field crops under carefully controlled conditions. He selected plants and trees for vigor and yield. He sold seed and nursery stock. He took pupils in small groups of three or four for a month's "short course" in scientific farming. He became the pioneer American manufacturer of chemical fertilizers.

His bold theories had been convincingly confirmed by the work of Baron von Liebig; and since he was familiar with these experiments, he naturally began to make superphosphate, as suggested by the great German agricultural chemist, by treating bones with sulfuric acid. As early as 1849 he produced this superphosphate for use on his own land. Three years later he prepared an "improved superphosphate of lime" from the charred bone which was a waste product from the sugar refineries to which he added sulfate of ammonia and Peruvian guano, which also had been treated with acid to prevent the loss of volatile ammonia and make the phosphate more immediately available for plant food. This was undoubtedly the first mixed chemical fertilizer made commercially in America, but his patent applications were held up and not issued until 1859. It is quite typical of Professor Mapes that once his patent rights were assured he never endeavored to enforce them, but on the contrary encouraged others to make and market similar fertilizer mixtures.

Till the day of his death, for he literally died in harness on January 10, 1866 at his New York home, he worked manfully and to good purpose to further the cause of better farming. For several years his health had been failing and he was never one to save his energies. The task he put upon his physique was increased by his excessive weight, and in the end his heart gave way under the strain. His death was undoubtedly hastened by his exertions when, as an expert witness in an important patent suit in Boston, it was necessary several times a day for him to climb a long, steep flight of stairs. He came up weak and panting, but his good humor could not be downed, and he exclaimed: "What a pity that when the United States owns so much land they are obliged to hold court so high up in the air."

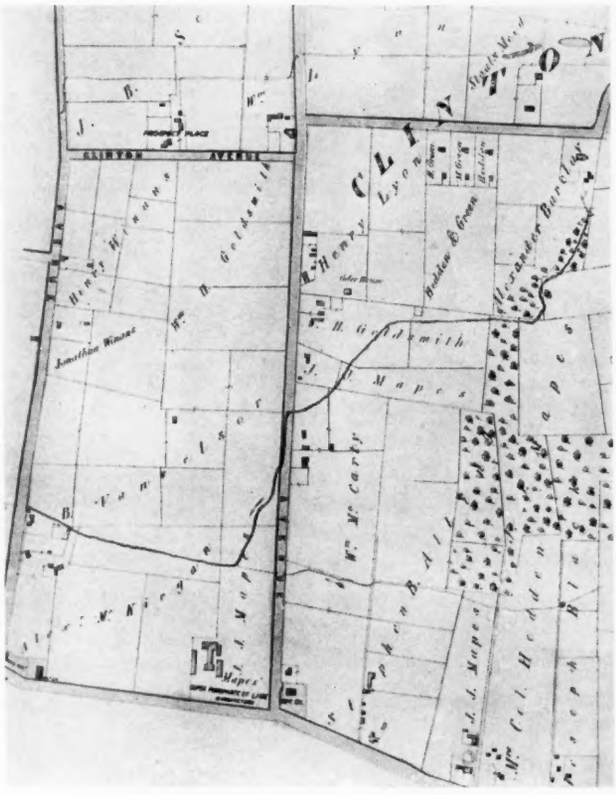
James J. Mapes was survived by his wife, three daughters, and one son; and the vigor and versatility of this great man has carried on through three genera-

tions of a family that has produced an exceptional percentage of distinguished individuals. His favorite child was a daughter, Mary Mapes Dodge, the author of the children's classic, "Hans Brinker," and for thirty years editor of *St. Nicholas,* whose keen mind and rare social and literary gifts owed much indeed to her father's influence, training, and encouragement. His son, as we shall see, succeeded him as a fertilizer manufacturer and won in his own right high honors as an agricultural chemist. Among his grandchildren are found a distinguished physician, James Jay Mapes II, who was the first to use diphtheria antitoxin in America and who made his name well known even in a very brief career, Victor Mapes, the playwright, and Clive Mapes who left the family business to become a pioneer in the radio industry.

The father of this distinguished trio, Charles Victor Mapes, inherited from his father a bent for natural science and an abiding interest in agricultural problems. He had the same versatile, brilliant mind, the same artistic and musical tastes. He may have determined to concentrate his efforts or he may have lacked his father's insatiable chemical curiosity; but at all events he centered his interests upon the fertilizer business with the result that he made a conspicuous success of this enterprise.

Charles Victor Mapes was born in New York, July 4, 1836, and the first ten years of his boyhood were spent in the city after which the family moved to the farm in New Jersey. Here he fitted up a little chemical laboratory in his bedroom and grew up a born chemist in the midst of intensive agricultural experiments. He went to Harvard and at one time planned to study medicine, but in 1858 entered the counting room of a firm of wholesale grocers in New York. The next year he established himself in Newark and with one of his employers as the silent partner who furnished the working capital, began the manufacture of farm implements and fertilizers. He took over the publication of his father's paper, *The Working Farmer;* and settled down seriously to what was to be his life work.

In 1877 the Mapes Formula and Peruvian Guano Company was organized and he became vice president and general manager. Offices were maintained in New York and the factory was located in Newark. When the New York Chemical and Fertilizer Exchange was



Above, map of the Mapes' farm in the Weequahic section of Newark, N. J. Left, the Mapes' home.

What Prof. Mapes Did in 1847 The Good Farmer Does in 1927

"I'll go to the crop", said Prof. James J. Mapes, originator of Mapes Manures. "I'll ask the crop to tell me what fertilizer it needs". Although famous as an expert chemist, Prof. Mapes knew that he could not depend on chemical analysis alone. So, in 1847, he bought a farm to check up, in the field, what he had learned in the laboratory.

The good farmer of today knows, as Prof. Mapes did eighty years ago, that the crop is the best judge of fertilizer values. He knows that two fertilizers of the same analysis may give widely different results because of the different materials from which they are formulated. So he buys his fertilizer on the basis of crop results, not on analysis alone.

That is why Mapes users are so loyal to Mapes Manures. And that is why more good farmers every year are becoming Mapes users. We go to the crop; we ask it what materials it likes best; we put these materials into Mapes Manures. Mapes Manures are made to grow good crops—not to sell at a price. They are first made right, then priced as low as possible.

If you are not a Mapes user, try Mapes this year. Compare the crop *yield*; compare the crop *quality*; compare the crop *profits* with the result from any other fertilizer you can buy. Mapes "costs little more —worth much more".

Just Mail This Coupon Today

Write today for a list of the crop brands and prices of Mapes Manures. You'll be surprised at the little difference in cost between Mapes brands and other brands. Mapes "costs little more—worth much more". Please tell us what crops you plan to fertilize so that we can be of the greatest possible service to you in selecting the right brand to suit your special needs.

The Mapes Formula and Peruvian Guano Co., Dept. 13,
270 Madison Ave., New York, N.Y.

Without obligating me in any way, please send me your list of crop brands and prices.

I use.....tons of fertilizer on the following crops: .....

.....

My name is.....

P. O.....State.....

MAPES
Manures

cost little more ~ worth much more

organized he was elected the first president. He worked long and faithfully to provide an open market for these materials, an effort that failed eventually because manufactured wares do not lend themselves economically to exchange trading in future deliveries. Like his father he often spoke at meetings of farmers and wrote articles on practical farming problems.

But Charles Victor Mapes' great chemical contribution was the special fertilizer particularly formulated to supply the deficiencies of certain types of soils or to provide the special plant food requirements of certain crops. In 1874 he prepared a fertilizer for Irish potatoes and marketed it to southern truck growers. This was the first special-crop mixture ever made in the United States and was followed by other specialized fertilizers for tobacco, citrus fruits, grapes, cotton, corn, etc. Much of the data upon which these various formulas were based came from experiments which Mr. Mapes made in collaboration with Professor W. O. Atwater. These were the first tests carried on in America under anything approaching modern methods of field fertilizer experiments and embraced careful checks on various natural manures, fertilizer ingredients, and complete mixed fertilizers.

So the tradition of scientific agriculture established by the father was pushed forward by the son, and with all due allowance for the advertising point of view, the following quotation from a booklet on citrus tree fertilizers issued in 1914 by the grandson, Charles Halsted Mapes, is interesting as confirming the family doctrine:

"We have been manufacturing fertilizers for over fifty years and have been furnishing them in Florida now about forty-five years, but there are so many newcomers in the state that it has occurred to us that they might be interested in hearing a little in detail what our company has done for fruit fertilizing, and our reputation in the state. The few fertilizers that were selling when we entered the Florida business have entirely disappeared from view. From the start, we established the business on a thoroughly scientific basis; in fact, we were the pioneers of scientific fertilizing in Florida. There is not an improvement in the business which we were not the first to suggest and carry out.

"We were the first to advocate the use of Sulfate of Potash and forms free from Muriates and Chlorides, so deleterious in saccharine and starch formation, long before the stations made any difference in valuations between the Sulfate of Potash and the cheaper Muriates of Potash.

"We were first to recommend the two distinct types of fertilizer, our Orange Tree Manure for wood growth, for growing the tree, and the Fruit and Vine Manure to develop the tree and fruiting power. This system proved itself such an absolute success that it was soon adopted by all other manufacturers.

"We were first to practise and call attention to the great value of varied as well as choice forms of plant food, and the seasoning process which takes place on goods made up and stored in piles, before bagging, long in advance of their use, so that they are thoroughly mellowed and ready to give immediate and best results on application to the crop.

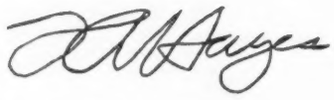
"We were, and are, practically alone in using the choicest phosphatic materials known, Bone and Guano, as a basis for our goods and thereby avoiding acidity of acid phosphate rock goods."

Likewise, it is interesting to compare the formulas and recommendations for the use of Mapes Fruit and Vine Manure with what is practiced today. The Mapes formula had a guaranteed analysis of ammonia, 2-5%; available phosphoric acid, 5-7%; potash, 10-12%, and the application of three pounds for the first year, six pounds for the second, and ten pounds for the third was suggested. Van Slyke recommends: 500 pounds of sodium nitrate, 500 of superphosphate, and 125 of potassium sulfate with applications of three pounds the first year, four and a half pounds the second, and six pounds the third. The principals remain much the same; but the total amount of actual plant food had been virtually trebled and the proportions of nitrogen and potash considerably increased.

Charles Victor Mapes married Martha Meeker Halsted on June 25, 1863 and they had two sons. Two of these, Charles Halsted Mapes and Clive Spencer Mapes went with their father into the fertilizer company. The first became active manager and served till the business was finally wound up in 1926, and the direct connection of their remarkably gifted family with the chemical industry was thus terminated nearly one hundred years after James Jay Mapes hung out his shingle as the first consulting chemical engineer ever to open offices in New York.

What the Chemical Buyer Thinks

Two prominent purchasers, the one from the tanning, the other from the rubber field, summarize here their views on chemical salesmen and chemical sales service



American Hide and Leather Company

THE purchase of chemicals does not involve anything in procedure that is foreign to the procurement of any commodity. A specialized knowledge is necessary, but that is true of hides, copper, coal or food products. A chemical buyer should know the use to which the chemical is to be put, and then buy something which is good enough for the purpose. Chemicals can be bought under specifications stating purity, physical form, etc.

The chemical industry, so far as I have found it, is usually glad to cooperate in such transactions by fully describing their product and guaranteeing the delivery of a uniform material when the sale and purchase of standard chemicals is concerned. When materials are offered under a trade name, the story may be different, and in general a buyer prefers to avoid such an article.

Perhaps the most useful information which a salesman of chemicals conveys to an experienced buyer is about prices and trends of prices. While this information is available in published forms from trade papers and business statistics, it often seems to mean more when personalized in the visit of a well informed salesman. New chemicals are constantly being developed and their use extended to different fields. Usually this is in the hands of a specialist who is first of all, a competent chemist; and second, who has the ability to recognize and assist in the development of practical applications. His salesmanship seems almost secondary but actually it is the real producer of new tonnage. Follow up and further contact may come from other salesmen, who while not of the research type, fill a useful purpose in maintaining contact.

The price structure of chemicals as covered by the usual contracts is simple and subject to adjustment every three months and therefore does not afford any particular problem in keeping track of it.

The Goodyear Tire & Rubber Company

AS a general rule, we find chemical salesmen are considerably above the average in the knowledge of their line. Due to the nature of the product which they handle, it is almost essential that the salesmen of chemicals be equipped with a college background and considerable chemical or engineering experience in order properly to discuss their product with chemical engineers in industry. This fact alone, I believe, probably explains why the men representing chemical firms have a better knowledge of their product than practically any class of salesmen calling on us.

Ordinarily, we do not like to buy chemical specialties under brand names. In a few cases where the use of a trade or brand name leads to brevity or simplicity, there is probably some advantage in ordering by trade name; but we feel that the best results, from all angles, are obtained by buying entirely against specifications.

We find no particular problem in keeping a record of chemical price changes. Naturally, we do not attempt to keep price changes on all of the various chemical items which may be, to a large extent, only used in laboratory and research work. We keep a price record of all big quantities entering into production and which are bought on a large scale, and any market changes on these items are carefully recorded. In the case of the miscellaneous chemical items, a satisfactory price record can be maintained by simply filling the price lists issued by chemical manufacturers and distributors.

Generally speaking, we find the information given us by chemical companies on their products is quite complete and sufficiently accurate satisfactorily to serve our requirements.

TIN

as a Chemical Raw Material

By Bruce W. Gonser

Metallurgist, Battelle Memorial Institute

SCARCELY an industry but uses tin in some form, and the chemical industry is no exception in regarding the metal as one of the indispensable raw materials for present practical operation. Substitutes may be used for many applications but usually at considerable sacrifice in performance or ultimate cost. Tin is used as the metal itself to some extent in the chemical industry, but its use alone as a material of construction is subordinate to its importance in alloys, in chemical compounds, and as tinplate in packaging.

Historically, tin is one of the oldest metals used by man. In combination with copper to form bronze, it was used in tools and weapons in the Bronze Age, and Chinese bronze dates back to about 1800 B. C. Phoenicians are said to have carried on an active trade in tin during 1500 to 1200 B. C. between mines in Cornwall and Spain and countries bordering the Mediterranean.

Use of tin for coating other metals extends back about 2,000 years. However, tinplate, or tin-coated sheets of wrought iron, was not developed as an article of commerce until about the 16th century, although it was known before that time. The use of tin in solder, in bearing metals, and for making tin oxides, chlorides, etc., is comparatively old since it has long been available as a raw material to chemists and metallurgists.

Applications of tin in the chemical, as in other, industries, depend on specific properties, usually not found in other common metals. Tin is not a cheap metal. At present prices it is more expensive than copper, aluminum, or nickel but is less than half the cost of cadmium and is far less expensive than silver. Competition with cheaper metals is consequently keen, and whenever another metal can be advantageously substituted for it tin is ruthlessly discarded. In spite of this, the properties of tin are such that its consumption is nearly at record levels entirely on its own merits.

The outstanding physical properties of tin are a relatively low melting point (232° C.), a hardness but little greater than that of pure lead, and a lasting bright silvery lustre. This ease of melting and of shaping with tools were qualities much appreciated by the ancient metal craftsmen and are still factors in holding down certain manufacturing costs. The metal does not harden greatly on working and anneals itself at room temperature; hence it can be drastically reduced to foil by rolling without annealing. Tin and many of its alloys are easily cast by die casting or other means.

Following are the principal uses of tin in the chemical industries:

The Pure Metal. Tin has excellent resistance to atmospheric and sea-water corrosion and can be used with a great many neutral, slightly acid, and slightly basic solutions. Acid resistance is particularly effective in the absence of air. This is well illustrated by the well-known wide variety of foods containing various organic acids that are successfully packed in tinned cans. One of tin's most important properties is non-toxicity; hence it is admirably adapted for use in contact with foods and beverages. Among heavy chemicals the usefulness of pure tin is restricted, as it is attacked by strong acids and strong bases, but alloyed with other metals, such as with copper to form a series of bronzes, it forms an important chemical corrosion-resisting structural material.

Block tin pipe, coils, and sheets are widely used in handling distilled water, carbonated beverages, beer, and for various distillery equipment. This is an old proven field for tin that recently has been receiving increased competition from other metals, particularly in breweries.

Tin foil, which is tin containing up to two per cent. of antimony, pioneered in the field of metallic wrapping material for protecting perishable articles and lining packages. It is still used for wrapping certain types of

TABLE I. UNITED STATES CONSUMPTION OF PRIMARY TIN *
(Long Tons)

Year	Tin in Tinplate	Tin in Babbitt	Tin in Solder	Tin in Bronze Collapsible Tubes and Foil	Tin in Other Manufactures	Total
1925	24,870	10,200	17,000[1]	12,000[1]	12,030	76,100
1926	26,120	9,700	17,000[1]	12,000[1]	11,380	76,200
1927	23,270	8,800	14,000[1]	11,500[1]	15,030	72,600
1928	25,580	8,800	13,600	12,800	18,820	79,600
1929	27,680	10,100	14,800	14,200	20,220	87,000
1930	26,150	6,300	11,500	10,900	16,750	71,600
1931	22,800	3,900	8,500	9,000	11,600	55,800
1932	15,750	2,400	5,200	7,600	9,650	40,600
1933	28,200	2,640	7,080	9,630	13,510	61,060
1934	24,450	2,810	8,620	10,400	7,000	53,280
1935	29,320	3,020	11,480	10,365	7,900	62,085
1936	35,770[2]	3,690	11,880	11,800	9,150	72,290

[1] Estimated.
[2] According to a report of the A. B. of M. S. dated April 12, 1937, the use of tin in the manufacture of tinplate in 1936 amounted to 36,694 tons.
*Statistical Year Book, 1937, International Tin Research and Development Council, p. 99.

cheese and to some extent in wrapping candy bars, tobacco, and the like, but this application has been made less important by competition with aluminum foil and paper-wrapped lead foil. Sometimes lead foil is coated with tin on one side. Tin-foil inserts are extensively used in bottle caps and other closures for use in bottling carbonated beverages and mildly alkaline solutions where aluminum foil would be unsuitable.

Collapsible tubes of tin are widely used as a packaging material for pharmaceuticals, toilet preparations, some foodstuff specialties, polishing pastes, insecticides, lubricants, paints, and similar products. As with foil, the pure tin, hardened with a little antimony, has competition from tubes of lead-tin alloys, tin-coated lead, and from lead and aluminum alone. For many purposes non-toxicity and corrosion resistance are essential, and tin tubes continue to hold a fair share of this field.

Granulated tin and powdered tin are familiar reagents in any chemical laboratory. They are used to some extent in industry as reducers and in preparing tin salts. Powdered tin is used in preparing certain metallic inks, in preparing alloys from powdered metals, and in tinning cast iron. Molten tin has frequently been suggested as a heating medium for high-temperature evaporation and processing in the chemical field because of the low vapor pressure of tin until very high temperatures are reached.

Tin Plate and Tinned Equipment. By far the most important application of pure tin is in coating other metals. In this way a much less expensive product may be obtained than by using pure tin, and the strength of the underlying metal is retained. Foremost among tinned products is common tin plate or mild steel sheet coated with less than a ten thousandth of an inch film of tin. Over two million long tons of tin plate were produced in the United States in 1936, of which nearly 60 per cent. was used in manufacturing food cans and most of the remainder in manufacturing general containers for miscellaneous products. It has been estimated that about 17 billion containers were produced in 1936 from tinplate.

A great many products from chemical industries are marketed in tin cans. Aside from all kinds of food products, lacquers, paints, alcohol, oil refining products, pharmaceuticals, dry chemicals, and a vast array of special products are sold in tinned containers. The packaging of lubricating oil in tinned or tin alloy-coated cans and the marketing of beer, ale, and wine in enamel lined tin cans have been recent developments that have emphasized the trend toward marketing products in strong sealed metal containers. Even those products that are marketed in glass very frequently use tinplate closures. This use of tin for coating containers has been rapidly growing, and indications are that it will

TABLE II. CONSUMPTION OF PRIMARY TIN IN THE UNITED STATES (Long Tons)*

Uses	1927	1928	1930	1935
Tinplate	24,525	27,053	27,753	27,290
Terneplate				208
Solder	13,602	13,874	11,407	9,736
Babbitt	7,595	8,150	5,438	3,665
Bronze	4,664	4,324	3,499	2,608
Foil	4,193	5,068	3,061	1,602
Collapsible Tubes	2,710	2,864	3,826[1]	3,548
Chemicals	2,621	4,246	3,268	626
Tin Oxide	1,311	1,183	666	1,074
Tinning	2,661	2,636	2,814	2,080
Tinning Wire	..	1,098	1,073	593
Equipment used in Food Preparation	..	312	706	593
Tubes, Sheets, and Shells	..	..	485	220
Brass and Bronze	..	..	103	
Iron Castings	..	1,226	64	
Retinning	..	..	55	674
Connecting Rods and Babbitting	..	..	48	
Rivets and Pipe Threads	..	..	8	
Other	..	..	272	
White Metal	849	802	1,117	347
Britannia Metal	..	..	434	..
Pewter	..	..	123	..
Other	..	..	560	..
Type Metal	450	411	223	163
Castings	1,011	730	74[2]	..
Bar Tin	..	..	..	368
Other Alloys	556	629	306	422
i.e. for:				
Cable Sheathing	..	37	20	..
Organ-pipe Metal	..	21	10	..
Fusible Plugs	..	8	6	..
Miscellaneous	1,450	2,399	1,996	2,042
Zinc Coating (Galvanizing)	..	133	107	620
Pure Tin Tubing, Pipe, Sheet, Wire, and Related Articles	..	..	1,075	950
Bottle Caps, Stoppers, Covers, and Sprinkler Tops	..	..	18	..
Other	..	2,266	796	472
Total	68,198	74,369	65,448	55,779

[1] More complete statistics than obtainable in previous years.
[2] Pure tin only; some castings of tin alloys reported in previous years.
*Statistical Year Book, 1937, International Tin Research and Development Council, p. 97.

TABLE III. UNITED STATES CONSUMPTION OF PRIMARY AND SECONDARY TIN *
(Long Tons)

Kind	1917 Total	1925 Total	1935 Primary	1935 Secondary	1935 Total
Tinplate	..	..	27,290	..	27,290
Terneplate	..	..	208	804	1,012
Tinplate and Terneplate	27,600	28,000	..	..	..
Solder	17,000	20,000	9,736	6,910	16,646
Babbitt	10,800	10,000	3,665	1,479	5,144
Brass and Bronze	4,800	5,000	2,608	2,157	4,765
Foil	4,000	(1)	1,602	27	1,629
Collapsible Tubes	2,100	7,500	3,548	..	3,548
Chemicals	1,718	2,500	..	..	..
Chemicals (Other than Tin Oxide)	..	..	626	2,579	3,205
Tin Oxide	..	..	1,074	175	1,249
Tinning	..	..	2,080	2	2,082
Type Metal	..	..	163	840	1,003
Pipe and Tubing	..	..	950	3	953
Galvanizing	..	..	620	..	620
Galvanizing, Tinning, or Retinning wholly or in part	2,717	..	..	..	..
White Metal	1,764	(2)	347	50	397
Plated Ware, Britannia Ware, etc.	1,002	(2)	..	..	..
Bar Tin	..	..	368	27	395
Miscellaneous Alloys	..	..	422	59	481
Miscellaneous	2,037	7,000	472	71	543
Total	75,538	80,000	55,779	15,183	70,962

[1] Included in "Collapsible Tubes."
[2] Included in "Miscellaneous."

*Statistical Year Book, 1937, International Tin Research and Development Council, p. 98. 1917 statistics compiled by War Industries Board; those for 1925 and 1935 by U. S. Bureau of Mines.

continue to expand for some time. Within the last few years ductile cold-rolled steel strip has improved the quality of tinplate available for many applications. Efforts to perfect organic can linings, to use deeply stamped or seamless can bodies or other means to avoid soldering, and to develop aluminum-coated steel may eventually result in the substitution of other materials for some of the present tin cans. At the same time the commercial development of continuous tinning of steel strip by electrodeposition and by hot dipping is likely to reduce costs and to favor continued and increased use of tin plate.

Much of the equipment used in processing food, in handling milk and other dairy products, and in handling miscellaneous dry chemical products is tinned. Besides giving a clean, sanitary appearance and resisting corrosion, it is economical. A tinned surface has a very low heat emissivity; hence it serves admirably in holding down radiant heat losses from pipes, tanks, and processing equipment. Tinned copper, on the other hand, makes an excellent heat exchanger and is advantageously used in many places as heating or cooling coils. Tin is easily sprayed with a modern spray gun, which makes easy tinning of a large fixed structure or repair of installed tin-coated apparatus.

An alloy of tin and lead is also used to coat steel sheet, producing terneplate. This is cheaper and much more corrosion resistant to strong chemicals and acid fumes than tin. It is used as a roofing material, in constructing ventilator hoods, in building non-food containers, etc. An interesting new application is the use of terneplate as a binder to fasten fabrics or similar non-metallic materials to steel, from which corrosion resistant bitumen-coated products, plastic coated sheets, and steel-backed wood panelling may be constructed.

Tin Alloys. The most common and most widely used alloy of tin is solder. This may consist of almost any proportion of lead and tin, but the most used solders contain from 35 to 60 per cent. of tin. The applications of soft solder joining lead, copper, and brass pipe, in making permanent electrical connections of all sorts, and in joining and repairing metal parts are so many that it remains an indispensable storeroom supply in any chemical plant. A number of flux cored solder wires and pastes of solder powder and flux are now available as well as solder in bar, cake, and foil form.

Like solder, babbitt is found in all chemical plant repair shops and in almost every piece of moving equipment. The usual tin-base bearing lining or babbitt contains a few per cent. each of antimony and copper. It is an excellent anti-friction material that effectively resists corrosion by lubricating oils. The trend in recent years has been to diminish the thickness of the babbitt lining, thereby giving a firmer support. This has diminished the amount of tin used in bearing metal, but there is no reason to think that the number of bearings using babbitt has been greatly reduced. In the last few years there has been considerable substitution of copper-lead and cadmium-silver base alloys for babbitt for certain automotive engine bearings, but due to corrosion difficulties the trend is now reversed.

Of direct application to the chemical industries as materials of construction are the bronzes, or alloys of copper and tin. The simple bronzes, copper containing up to about 15 per cent. tin, such as the 10 per cent. tin alloy-gun metal, are used to some extent, but the many special bronzes containing minor additions of other metals, particularly zinc, lead, phosphorus, nickel, manganese, or iron, are of greater importance. Tin greatly hardens and strengthens copper. Also, the bronzes have

excellent resistance to chemical corrosion by salt solutions, acids, and mild alkalis. They are consequently used extensively in chemical plants as valve parts, pumps, gears, bearings for heavy machinery, agitators, pipes and fittings, screens, filters, chains, and parts of various machinery. Often bronze parts such as bushings are made by pressing powdered copper, tin, and other constituent metals under heavy pressure and heat treating the product. Bronze coatings are sometimes electroplated on to other metals. Applications for bronze have varied in recent years with industrial activity. Substitutions by other newer alloys have decreased the bronze used in some applications, but the uses of bronze are so varied that no marked trends can be definitely stated.

Tin is frequently a constituent of the brasses or copper-zinc alloys, many of which are used in sheet and tube form, as well as in castings. Of particular importance are the brasses containing 30 and 40 per cent. zinc to which about one per cent. of tin is added to give corrosion resistance to salt water. Like the tin bronzes, the tin bearing brasses, often with a little lead added, are easily machined. Finished products of brass or bronze are often more economical to produce than similar articles made of steel.

Lead-base alloys containing tin, other than solder, are used in chemical handling equipment as bearings, bushings, and metallic packing. The type metals with from 3 to 30 per cent. tin make printing possible, which directly affects the ink manufacturers. Zinc-base alloys using tin are less important, although some of these alloys, such as aluminum solders, certain bearing metals, and die castings, are used in chemical operations. There is, however, a great array of useful miscellaneous alloys used in chemical plants that contain tin as a minor constituent. Easily fusible metals containing usually 15 to 30 per cent. tin are used in automatic fire control systems and in fuses, while safety plugs in boilers often consist of pure tin.

Chemical Compounds. Most important of the tin compounds are tin (stannic) oxide and stannic and stannous chlorides. The chlorides and some oxides are produced largely from secondary tin, particularly by detinning scrap tinplate. Most of the tin oxide and many miscellaneous tin salts are made from primary tin.

Tin oxide is an important raw material for the ceramic industries where it is widely used as an opacifier in enamels and glazes. This includes the finishing coats on pottery goods and terra cotta, as well as the enamel used for hollow ware and in cast iron enamelling for plumbing goods and miscellaneous applications. Stannic oxide is also used in manufacturing several ceramic colors and in glass making to form white enamel or white opaque glass. It has long been used as an excellent polishing medium for glass, marble, steel needles, and other metal products, and even in the manufacture of finger nail polish. In some syntheses, stannic oxide is used advantageously as a catalyst. General uses include its use as a base for the manufacture of other tin salts, as a constituent in some paints and in putty, and in the textile and cosmetic industries. Stannous oxide is used as a powerful reducing agent.

The chlorides are used largely in the textile industry. The former very important application of stannic oxide in weighting silk has decreased in amount, but it is still used for this purpose. Both chlorides find important applications as mordants in dyeing. Stannic chloride is used in dyeing silks, as a color brightener in dyeing wool, as an addition to sizing compounds for cotton, in the manufacture of fuchsine and of calomel, and as a dehydrating agent, particularly in organic synthesis. It has been used as an antiseptic, as a substitute for aluminum trichloride in petroleum refining, and as a weed killer. In addition to being used in manufacturing textiles, in dyeing, calico printing, etc., stannous chloride is used as a reducing agent, such as in removing ink stains and to a limited extent in bleaching sugar. It is a much used chemical laboratory reagent. Industrial uses also include some applications in ceramics and glass making, in manufacturing metalline for printing, in pre-treatment of glass for silvering, to a limited extent in dehairing of hides, and as an accelerator in certain fermenting operations.

Among the many miscellaneous commercial salts of tin, the chromates are used in decorating porcelain; stannous oxalate, sulfate, tartrate, and acetate are used in the dyeing and printing of fabrics. Stannic sulfide finds a useful application as a gilding or bronzing material when suspended in a lacquer or varnish. Sodium stannate is being used increasingly in tinplating baths.

Uses for the tin compounds of tin shift with the development of new materials and reagents so that no application may be considered entirely permanent. Most of the typical applications mentioned, however, have been in use for some time and are quite well established. Competition with antimony oxide or sodium antimoniate as an opacifier has diminished the use of tin oxide in the enamel industry to some extent in recent years, to give one example, but because of several advantages in control, efficiency, stability, and nontoxicity, tin oxide continues to hold a large section of this field. The consumption of silk and consequently of some of the tin salts used in the weighting, dyeing, and printing of silk has been affected by the tremendous growth in the use of rayon. Other substitutes or economic changes may be expected to occur. On the other hand, new uses are being found.

Tin compounds, such as tin oleate, have been found by recent research to have considerable merit in increasing the life and improving the service of lubricating oils. Stannic chloride or other tin compounds are being used as an intermediate reagent in the manufacture of rubber hydrochloride resins, transparent wrapping material, and rubber base pigments. The growth of electro-tinning is making a market for some tin salts. As Table III indicates, the total consumption of tin in salts and compounds has been increasing at a substantial rate.

(To be Continued in November Issue.)

Stoneware Towers

By Charles H. Butcher

THE absorption of gases in liquids is a process common to many chemical works. The object may be the preparation of a solution of the gas at a concentration suitable for convenient use in industry, or as an intermediate stage in the manufacture of other products. Moreover, the absorption process may be used for the recovery of a particular gas from a mixture of gases, or for the removal of a particular impurity present in a gas or mixture of gases. In the majority of cases the absorbing liquid is water; in most other cases a solution of an alkaline salt.

The process may be spoken of as gas absorption, gas scrubbing, or gas washing; the three definitions are more or less identical, but are applied in definite directions as modifications of the real physical process involved. For instance, there is the *absorption* of hydrochloric acid gas (from salt-cake furnace or other source) in the manufacture of hydrochloric acid; also the *absorption* of oxides of nitrogen in nitric acid manufacture. In the ammonia-soda process the saturation of ammoniated brine with carbon dioxide is also a case of *absorption*. The recovery of carbon dioxide from waste flue gases by an alkaline solution might be regarded as a *scrubbing* process, if the object is the recovery of the carbon dioxide; where the object is the removal of carbon dioxide from air the process may be termed either *scrubbing* or *washing*. The removal of flue dust from flue gases by water would be a *washing* process.

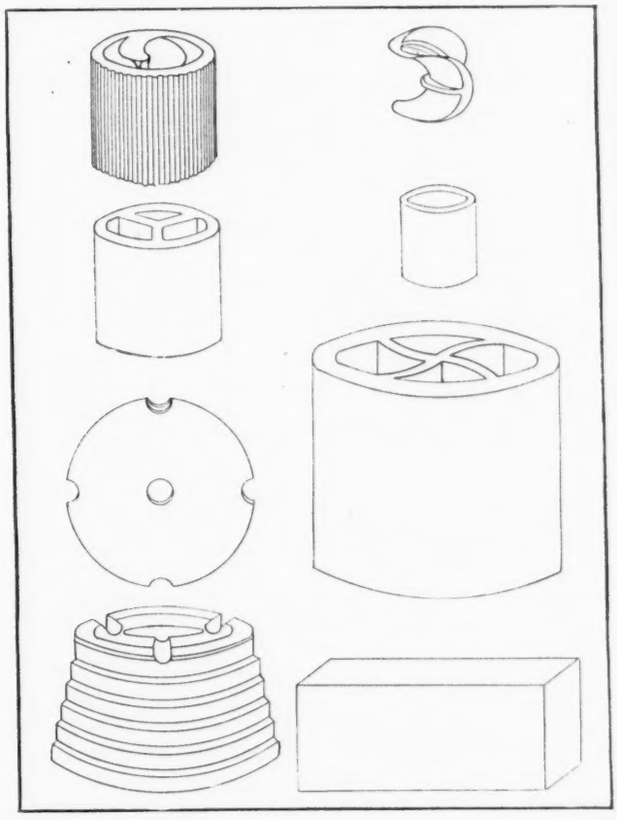
For all of these processes an absorption tower system provides the ideal equipment, and as many of the processes involve the handling of acid gases, acid solutions and sometimes alkaline solutions (as the absorbing liquid)—all of a corrosive nature—the tower system is built preferably of chemical stoneware. In many cases use of any other material involves the necessity of replacing parts of the tower at frequent intervals due to corrosion. Chemical stoneware will successfully resist the action of all inorganic acids except hydrofluoric and certain concentrations of phosphoric acid; in addition, it is especially satisfactory for acetic acid vapors, chlorine gas and aqueous solutions of chlorine. Solutions of alkaline salts as normally used in gas absorption practice also have no corrosive action.

Stoneware towers have several uses apart from the general process of gas absorption. They can be usefully installed to effect the addition of water vapor to a mixture of acid gases for subsequent use in catalytic reactions; for the removal of dust from dusty gases; to effect by fractional distillation the separation of volatile components from a mixture of liquids which is of corrosive nature (provided temperature conditions do not exceed the safe working limit for stoneware); and also to humidify and cleanse air for the ventilation of rooms where special manufacturing or packing operations are in progress.

Gas absorption practice demands a high degree of intimate contact between the gas and the absorbing or scrubbing liquid. To effect this the tower is provided with a honeycomb arrangement of special "tower packings" (sometimes spoken of as "tower fillings"), which are also made of chemical stoneware or some equally good corrosion resisting ceramic material.

It is the usual practice for the gas or mixture of gases to pass through the tower in an upward direction, while the liquid (necessarily) flows down the tower. This mode of operation is spoken of as "counter-current" and gives the maximum operating efficiency. Only in exceptional circumstances do gas and liquid pass through the tower in the same direction, i.e., down the tower or in "parallel-current." The process is a continuous one, fan suction being employed to maintain the flow of gas, and a pump being installed to provide the flow of absorbing or scrubbing liquid.

The liquid may be continuously re-circulated through one tower until it has reached a desired degree of saturation by the gas, with provision for the intermittent or



Various forms of stoneware packing are shown above. Left to right, spiral rings, berl saddles, partition rings, raschig rings, hollow balls, curved partition rings, cones, and brick or tile.

continuous addition of a small quantity of fresh liquid and the removal of a corresponding quantity of the gas-saturated liquid. Two or more towers in series may be employed to attain a maximum degree of saturation, or the maximum removal of one gas from a mixture of gases; under these circumstances an overflow of the absorbing liquid passes from tower to tower getting more and more saturated with gas, while the residual gas from one tower passes on to the next tower in counter-current to get less and less concentrated.

Pumps feeding the towers with liquid usually discharge to overhead feed tanks; where there are two or more towers in series, each tower has its own pump and feed tank. The tank is desirable to provide for unforeseen fluctuations in the operation of the pump. Sometimes in the case of a single tower there is a large overhead feed tank, filled by the intermittent operation of the pump; in other cases the pump may deliver the liquid direct to the tower in a continuous stream (by centrifugal pump) or in "flushes" (by plunger pump).

Constructional Features

As stoneware towers are built up in sections different effective heights can be arranged. The diameter of the tower is governed by the quantity of gas to pass through it. Towers of various internal diameters from 12 inches to 36 inches are commonly in use. The height of the individual sections is generally 30 inches. The total effective height as erected at the user's plant is often decided in a more or less arbitrary manner, but can be settled to an approximate degree of accuracy by making small scale experiments to find the minimum number of seconds or minutes for liquid and gas to be in contact in order to bring about a desired degree of absorption. When this minimum time contact is known, for a tower of given diameter the height will be proportional to the speed at which the gas is passing through the tower; if the diameter is increased the gas will move more slowly and the height of the tower may be correspondingly reduced.

A complete tower comprises a bottom section, with an outlet for the pump to draw off the liquid in the act of circulating it and an inlet for the gas entering the tower; a number of middle sections, provided with perforated plates or grids to support the tower packings; and a top section, with liquid inlet, liquid distributing device, and exit for any gas or gaseous residue leaving the tower. In towers which are operating in series provision for the introduction of fresh liquid is arranged on the overhead tank, and the overflow of gas-saturated liquid to the next tower is obtained from a branch connection on the delivery side of the pump.

Tower packings of many patterns have been made for use in gas absorption and gas scrubbing practice. Prior to the invention of special shapes the towers were packed with lumps of stone (quartz), broken glass, lumps of hard coke, or a chequerwork of acid resisting bricks or tiles.

The plain tubular ring, like a short pipe of equal diameter and length, is one of the simplest of the manufactured forms, and considered from all aspects it can claim to be the most efficient. These rings, as commonly used, are of 1 inch, 2 inch, or 3 inch sizes. The large (3 inch) rings are always packed in the tower in regular arrangement, layer on layer, the individual rings in each layer being out of alignment or staggered with respect to those in the layer below. By this means a honeycomb structure is obtained throughout the interior of the tower to provide a large surface area for the intimate contact of gas and liquid, while the actual path of the gas in passing up the tower is considerably lengthened. The smaller (1 inch and 2 inch) rings are "dumped" in the tower higgledy-piggledy to give a much more complicated honeycomb structure, with a most tortuous path for the passage of both gas and liquid, and one which in length greatly exceeds the direct height of the body of rings.

When the tower is in operation the whole of the ring surface must be wetted by an adequate supply of the gas absorbing or scrubbing liquid. As it is by contact at the wet surface that gas and liquid are in the most favorable condition for absorption to take place, it will be evident that the tower packing should provide a surface area as large as possible to be wetted by liquid. At the same time the material of which the packing is made must not displace too much space within the tower, and so reduce the space which is available for the passage of the gas. These two desirable features are characteristic of the plain tubular ring packings. The 1 inch rings, as usually made, will provide about 60 square feet of surface per cubic foot of tower space, when in irregular arrangement. At the same time they leave about 80 per cent. of that space free for the passage of the gas. The 3 inch rings, packed in regular arrangement, give about 26 square feet of surface per cubic foot, and also leave about 80 per cent. of free gas space.

Increased wall thickness of the rings can very much reduce the free gas space; on the other hand, the wall thickness must not be reduced to such an extent that the strength of the rings will suffer and there is risk of crushing under the superimposed weight as packed in the tower. This, of course, is a point which concerns the makers of the ring packings, but it should warn users not to cut the cost of a tower by reducing the number of perforated plates to support the rings in the tower.

Erection Precautions

The weight of a stoneware tower, complete with tower packing, is very considerable; when erected care must be taken to ensure an even distribution of this weight. It is owing to the question of weight in regard to the packing that it is necessary to provide perforated plates to support the packing at more than one level in the total height of the tower. Sometimes there is a perforated plate at the bottom of each middle section,

sometimes in every other section; the latter arrangement is usually satisfactory and is preferable, because too many perforated plates will unduly hinder the passage of gas and liquid.

The bottom section of the tower must be evenly supported; this is often done by setting it on a grout of Portland cement mortar. Sometimes a bed of sand, about 2 inches thick, kept in position by a ring of concrete, is used; this allows the base of the tower to take up any expansion on its diameter. Wood or metal framework which may be erected with the tower must not be fixed too tightly against the stoneware; allowance must be made for expansion and contraction, for the possible swelling of wood by moisture, and increased tightness due to corrosion of metal supports. In the case of tall towers the weight of the individual sections should be carried by external framework.

When packing the tower to provide its honeycomb structure, it is easy to put in the large 3 inch rings, layer on layer in regular arrangement, as each section of the tower is erected, the rings being staggered. With small (1 inch) rings, which are merely dumped in the tower, special care must be taken to avoid the breaking of any of the rings. Small rings are best handled in small batches at an extra expense of labor, as fragments of broken rings can easily accumulate at the level of the perforated plates and there choke some of the perforations when the tower is in use. If joints are sealed and each section of the tower is filled with water as erected the small rings may be dropped in without risk of breaking.

The annular space at the bell-and-socket joints throughout the height of the tower must be sealed in a gas-tight and liquid-tight manner before the tower is put in operation. The materials used are really governed by the nature of the gas and liquid which will pass through the tower, but in many cases it is quite satisfactory to tightly press several layers of wet asbestos rope into the annular space of the socket, and then fill the remaining part of the socket with special acid-resisting cement or putty, and finish off with a top dressing of Portland cement mortar. Lead wool may be used in place of the asbestos rope, if gas and liquid permit the use of lead; where permissible, rubber gaskets can be inserted. Sometimes pitch of high melting point is used in place of acid-resisting cement.

Diameter of the tower and suitable size of packing are decided with due consideration of the volume of gas to be handled per hour, the rate at which liquid will flow over the tower packing, the amount of draught available for drawing the gases up the tower (or through the complete tower system if two or more towers are in use), temperature conditions, etc.

In the case of 1 inch rings, which provide the most efficient packing for all towers irrespective of diameter (but become an important item of cost in very large towers), it should be noted that if each square foot of tower cross-section is passing 10,000 cubic feet of gas per hour counter-current with 40 gallons of liquid per hour, the back pressure which the fan has to overcome will be approximately 0.25 inches of water for each effective foot height of the ring packing. When the throughput of liquid is increased to 120 gallons per hour per square foot of tower cross-section, the back pressure will be doubled; at 200 gallons per square foot "choking" will take place. The linear speed of the gas in this particular example would be 3 feet per second, so that passage through a tower 15 feet high would take a minimum time of 5 seconds. To increase the time contact between gas and liquid, the tower could be increased in height (at the expense of increasing the fan suction from a minimum of 3¾ inches of water), or the speed of passing the gas through the tower could be reduced. Each particular problem must be considered on the basis of the available data. Sometimes the linear speed of the gas is only 0.3 feet per second; indeed, in the case of towers which are engaged in the absorption of ammonia by water the speed of the gas is usually between 0.3 and 1.3 feet per second.

The larger the diameter of the tower the more essential is an efficient distributing device for the absorbing or scrubbing liquid. This is especially so in the case of towers packed with large (3 inch) rings. In the case of the small (1 inch) rings any possible shortcomings of the liquid distributing device will be rectified to some extent by the irregular arrangement of the rings, which has a special virtue of carrying liquid over the whole of the tower cross-section before this liquid has passed down the tower for any appreciable distance. In addition, it is entirely due to the irregular arrangement of the small rings in quantity (amounting to at least 1200 per cubic foot of tower space) that any "channelling" of the liquid is avoided.

Where Stoneware Towers are Needed

Manufacture of hydrochloric acid by absorption of the acid gas in water.

Manufacture of nitric acid by absorption of oxides of nitrogen in water.

Manufacture of alkali by the ammonia soda process, in saturating the ammoniated brine with carbon dioxide.

Absorption of ammonia by water, or by dilute acetic acid.

Absorption of sulfur dioxide from flue gases by water, dilute caustic soda solution, milk of lime or a slurry of powdered chalk.

Absorption of sulfur dioxide from smelter gases by a mixture of xylidine and water.

Absorption of chlorine by water, or by milk of lime as in the manufacture of "bleach" at sulfite pulp mills.

Absorption of carbon dioxide from flue gases, or the removal of carbon dioxide from air in special cases, by dilute caustic soda or caustic potash solution. Carbon dioxide is recovered from flue gases in this manner, and is also removed from water gas to leave a pure hydrogen for industrial use as in the case of a hydrogenation process.

Absorption of carbon dioxide by diamino-isopropanol.

Absorption of sulphuretted hydrogen by sodium carbonate solution.

Absorption of carbon dioxide (or sulphuretted hydrogen) by a solution of triethanolamine in water. A particular case for carbon dioxide occurs in the preparation of hydrogen for hydrogenation processes.

Recovery of acetic acid from mixtures of acetic acid and water by the use of benzene.

Manufacture of sodium thiosulphate by the soda ash and brimstone process.

Liquefaction of chlorine obtained as a by-product in the electrolytic manufacture of caustic soda.

Concentration of nitric acid from 50/60 per cent. to 95/98 per cent.

Scrubbing flue gases to remove sulfur compounds and dust, and subsequently recovering the pure carbon dioxide in a solution of potassium carbonate.

Manufacture of hydrogen peroxide by the electrolytic process.

Removal of acid fumes from air adjacent to pickling tanks at electroplating works, before the air is discharged to the outside atmosphere.

Extraction of ethylene from "cracked" petroleum oil gases or "cracked" coke oven gas, using acetone as solvent.

Removal of carbon dioxide and dust from air prior to liquefaction, using caustic soda solution.

Removal of impurities from hydrogen as made by the action of steam on oil refinery gases, or from water gas, producer gas, coke oven gas, etc.

Extraction of pure acetic acid from the crude pyroligneous acid obtained in the distillation of wood waste.

Removal of phenolic compounds from effluent liquors containing ammonia, by the use of an inert gas which is then scrubbed by caustic soda solution or by benzene.

Extraction of ammonia gas from waste or process gases by scrubbing with sulfuric acid with direct conversion to sulfate of ammonia.

Refining lubricating oils of petroleum origin by the use of solvents such as furfural, phenol, cresylic acid or a mixture of sulfur dioxide and benzene.

Distillation of acetic acid (Stoneware towers are sometimes used in place of copper towers).

Gas drying by the use of glycerine.

Humidification of air by water (Stoneware towers are not essential, but are sometimes preferred as there is no rusting of the tower packing or internal walls of the tower).

Industry's Bookshelf

Industrial Chemistry by Emil Raymond Riegel, Reinhold, N. Y., 851 pp., $5.75.

A new edition—the third—of this admirable text within four years after its last publication speaks its deserved popularity. Aside from its great usefulness in the classroom, it is a splendid, handy reference work on the industrial processes, particularly strong in historic background, cost and production figures, and its very complete references.

Economic Backgrounds of the Relief Problem by J. P. Watson, Univ. of Pittsburgh, Pittsburgh, 144 pp., $2.

Taking the highly industrialized Allegheny County, Pa., as a "case study," this careful survey is of extreme timely importance, stressing as it does, the causes and persistence of relief.

Mikrochimica Acta, Organ fur reine und angewandte Mikrochemie, Julius Springer, Berlin, RM. 30 per volume, through Universum Book Export Co., N. Y. C. $10.

A volume of this new journal for pure and applied microchemistry is complete in three numbers, and one volume will be published each year.

Beilstein, Handbuch der Organischen Chemie, Julius Springer, Berlin, RM. 138, through Universum Book Export Co., N. Y. C. $40 volume.

This Fourth Edition of the "Heterocyclische Reihe" should be included in every organic chemist's library.

Names of the Month—

A Current Supplement to the Chemical Who's Who

BORN, Sidney, prof. pet. res., Univ. Tulsa; pres., Born Eng. Co., Inc.; b- N. Y. City, 12 June 1889; mar. Suzanne Vlcek, Alton, Ill., 1 May 1914; 1 son; educat., Columbia Coll., B.S. 1910; Columbia Univ., Ph.D. 1913. Mallinckrodt Chem Wks., res. chem., Lemp Brewing Co., chf. chem. 1913-15; Rittman Process Corp., chf. chem 1915; Empire Refineries Inc., Empire Gas & Fuel Co., Empire Gasoline Co., chf. chem. 1916-20; Transcontinental Oil Co., asst. gen. supt. 1920-31; Univ. Tulsa, prof. pet. res., 1931 to date. U.S. Bur. Mines, consult. engr., during World War. Author of numerous pubs. in various Oil Jls. Res. on synthesis of alcohols from pet. gases; mfg. asphalt by vacuum distillation from Mid-Continent Crude Oil. Memb. A.C.S.; A.S.T.M.; F.A.I.C. Clubs: N. Y. Chemists'; Engineers (Tulsa). Hobby: antique glass. Address: Univ. Tulsa, Tulsa, Okla.

FAIR, Albert Edward Harold, mgr., Alliance Paper Mills; b- Midland, Can., 2 Mar. 1899; mar. Mary Eloise McLaren, St. Catharines, Can., 21 Jan. 1925, 1 son, 1 dau.; educat. Univ. Toronto, B.A.Sc. 1922; Royal Milit. Coll. (Canada) 1918. Lincoln Pulp & Paper Co., supt. paper mill 1923-27; Arthur D. Little, paper mill management and consult. and v-p. Windsor Locks Mills; Alliance Paper Mills, gen. supt. 1929-30, mgr. Merritton div. 1930-37. Canadian Field Artillery, Lt., overseas 1918. Author var. paps. for T. A. P. P. I. Pats. on spec. paps.; system for paper filling. Memb. Sigma Chi; T. A. P. P. I. (exec. com. 1935-36); Niagara Dist. Chem. & Indus. Assn. (pres. 1935-36); Can. Pulp & Paper Assn. (var. coms. tech. sect.). Clubs: St. Catharine's Rotary (dir.) Hobbies: golf, fishing. Address: Alliance Paper Mills, Merritton, Ont., Canada.

HUTCHINS, Wayland Dewey, dist. chem., Southern Cotton Oil Co.; b- Liberty, S. C., 15 July 1896; mar. Clara Clark, Simpsonville, S. C., 24 June 1917, 2 daus.; educat. Clemson, A. & M., B. S. 1917. Southern Cotton Oil Co., hd. lab. 1917, dist. chem. 1920 to date. Memb. Am. Oil Chem. Soc. (pres. 1934); A. C. S.; A. S. T. M. Hobbies: sports. Address: P. O. Box 280, Savannah, Ga.

JENNER, Robert Wesley, supt., Cliffs-Dow Chemical Co.; b- Port Sydney, Ontario, 12 July 1909; mar. Ethel W. Frigerio, Toronto, 25 July 1936; educat. Univ. of Toronto, B.A.Sc. 1932; Case Schl. Applied Sci., M.S. 1933. Dow Chem. Co., chem. engr. 1933-35; Cliffs Dow Chem. Co., chem. engr. 1935-36, supt. 1937. Memb. A. C. S., Sigma Xi. Hobbies: canoeing, hunting, outdoor sports. Address: Cliffs Dow Chem. Co., Marquette, Mich.

SHALLCROSS, Samuel M., v-p., gen. mgr., American Lime & Stone Co.; b- Wilmington, Del., 25 Mar. 1893; mar. Winifred Bach, Wilmington, 2 sons; educat. Del. Univ., B. S. in E. E. 1914. Westinghouse Elec. & Mfg. Co. 1914; Electric Bond & Share Co. 1917; C. E. Knoepple & Co. 1922; Amer. Lime & Stone Co. to date. U. S. Naval Res., 1917-19. Memb. A. I. M. E., Chem. Soc.; Masons; Amer. Legion; Elks; Centre Co. Engr. Soc. (exec. com.); nonfaculty adviser, Penn State Mining Soc. Clubs: Univ. Pittsburgh; Univ. State Coll., Pa.; Nittany Country; Kiwanis; Centre-Clearfield Crippled Children Soc.; Bellefonte Sportsmen Assn. Hobbies: books, stamps, accordion, farm, forestry, fishing. Address: Amer. Lime & Stone Co., Bellefonte, Pa.

"Why Chemists Get Fired"

Second installment of answers and opinions from prominent technicians

Imagination and Initiative

By Garson Meyer
Chief Chemist, Camera Works, Eastman Kodak Co.

The younger chemists, as we see them, seem to lack imagination, initiative, and either the ability or the desire to accept responsibilities. Although I think the problems are definitely personal I also think that they can be corrected if they are made part of the educational program.

Non-Industrial Instruction

By R. R. Bottoms
Chemical Director, Swann & Co.

I have been thinking the matter over quite intensively and I have come to the conclusion that what objections there are at present to the training of technical men for industry mainly rests with the instructors in the various technical classes at the colleges and universities. These men, as a usual matter, while they have had technical training, have had very little industrial experience and naturally are not competent to transmit to the student the industrial viewpoint.

The greatest objection that I have found however, regarding most men coming into industry from the universities, is largely personal. The universities have not, in my opinion, done sufficient weeding out in the undergraduate courses and a great many men finish and are then offered by the university to industry as being properly equipped. This phase of the matter probably also rests with the instructors. Since they have not had practical industrial experience they are not qualified to judge the fitness of a man for industrial work.

Language and Technique

By Allan F. Odell*
Formerly Chemical Director, Plastics Dept.
E. I. du Pont de Nemours & Co.

The high spots I am setting down are the things which have struck me as most necessary and most often lacking in the men whom we have employed over the past several years and who cover a very good cross-section of American university graduates. In our research work we employ only Ph.D.'s and I think perhaps the criticisms I make in their cases would be strongly applicable to the younger chemists and chemical engineers.

The most striking defect in the training of practically every man we employ is the lack of knowledge of English composition. Out of about one hundred men who have gone through our department in the past seven years not more than two have shown any ability in this direction. The others are not only unable to write a good letter but cannot write a systematic report, and oftentimes cannot draw the right conclusions on paper from the work that they have done—the report often showing practically the opposite of what is the laboratory fact. We have found it necessary many times to bring the men in and give them a course in report and letter writing and have sent unsatisfactory material back to them time and time again until they become more or less proficient. We have usually been successful in the course of a year or two in getting them to write the matter up in proper style.

The second point which I wish to bring out is a failing in a large proportion of the men whom we take on (in this case perhaps 75 per cent.), namely, the lack of sufficient knowledge of mechanical manipulations. They set up equipment poorly and have little knowledge of tools or mechanical routine generally. Our men must constantly invent and design new equipment for new processes, and they must follow these through the machine shop or glass laboratory, or wherever these things are made. This experience is practically all accumulated after they come with us, and the rapidity with which they grasp the matter shows the widest variation in individual aptitude.

Another matter which has been impressed upon me gradually is that the graduate work, especially of our eastern universities, is becoming cluttered up with a quantity of useless matter. The graduate student, who in my opinion should carry not more than three subjects, a major and two minors, will in many instances be found to be carrying during the course six or eight subjects which fill up his entire day with lectures, and these subjects consist of unnecessary courses which scarcely deserve anything more than the term "reading matter." An example is to be found among such things as three months devoted to the study of sewerage disposal or to garbage disposal, municipal sanitation,

Dr. Odell died on April 10, 1937.

water purification, chemistry of canning and a host of others too numerous to mention. Any of these things the average student could comprehend in a couple of days by reading over the text books. These things are taking up time that should be spent by the graduate student in independent thinking, library work and laboratory research.

In general, we find our men have a very fine chemical foundation. We find no fault with this in general, but we think that in the larger universities, with their large staffs, too many men want a finger in the educational pie, with the result that the man is literally choked with miscellaneous learning not at all pertinent to his training for a research man. You will see that I am making no distinction between research men and industrial men, as I think that the best industrial man is one who has a good research background; at least this has been the experience in our whole company.

You ask whether the matter is a personal problem or an educational one. In my opinion it is entirely an educational one. At the same time we comb the personnel of the universities pretty thoroughly before we employ their graduates, so that there may be a personal problem with which we are not acquainted.

The only suggestion I have to make for the correction of these difficulties is one which I believe is being employed at the present time by some of our larger universities, *i.e.*, they have a board comprised of some of the leading industrial and research men who cooperate with the faculty in a discussion of the curriculum. We believe a strong effort should be made to stress the training in fundamentals and leave the padding as reading matter for the student to take up at his leisure.

Perspective and Technique

By Walter O. Walker
Director Research, Ansul Chemical Co.

Two things are quite definitely necessary in addition to the standard training of a young chemist. We find the young chemist lacking in these particulars:

1. His training has been along the lines set by instructors whose primary interests are in academic research, and he therefore lacks the perspective of the industrial research chemist.

2. He is usually a very poor technician, which of course places him under a great handicap and necessitates his training in this particular.

These deficiencies might be eliminated by the inclusion, in the curriculum of graduate students of chemistry, of a course designed to acquaint the student with the aims and ideals of industrial research and a definite insistence on the part of the instructional staff that each student take a suitable course in glass blowing, apparatus manipulation, etc. These additions to the work required for graduate degrees would do much toward preparing the younger chemist to fit in more quickly in an industrial laboratory. It seems to me that there should be one or more men on the instructional staff of graduate departments of chemistry, who have had thorough training and a lot of experience as industrial chemists and who therefore can give to the student definite, concrete instruction in industrial research.

Personality Minus

By A. M. McAfee
Research Chemist, Gulf Oil Co.

The other evening I was a guest at a banquet of some twenty-five recent graduates in civil, electrical or chemical engineering. When it came introduction time, only one identified himself in a pleasing, easy manner. All save this one were uneasy, self-conscious, and more apologetic than assertive. I inquired about the one who had so graciously handled himself, and was informed that he is a graduate chemical engineer and is here at one of our refineries in training to enter the sales department of the corporation with which he is connected. The Dean, himself, did little better than the group as a whole.

Certainly no fault can be found with the technical training which these engineers had, but one wonders why they didn't put in a little time developing personality or whatever one wants to call that intangible, undefinable something. I haven't the least doubt that the one exception referred to above will get somewhere. He has the technical training, and he has the personality to make that training effective.

I know of no better way to answer to your inquiry than by citing this example. Without further detail, you will appreciate what I am talking about involves far more than merely the ability to handle oneself in public. Traditionally the chemist and the engineer by training and work habits are personality effacers. I think it is high time to overturn this tradition, and the schools are the place to do it.

(To be Continued in November Issue.)

Industry's Bookshelf

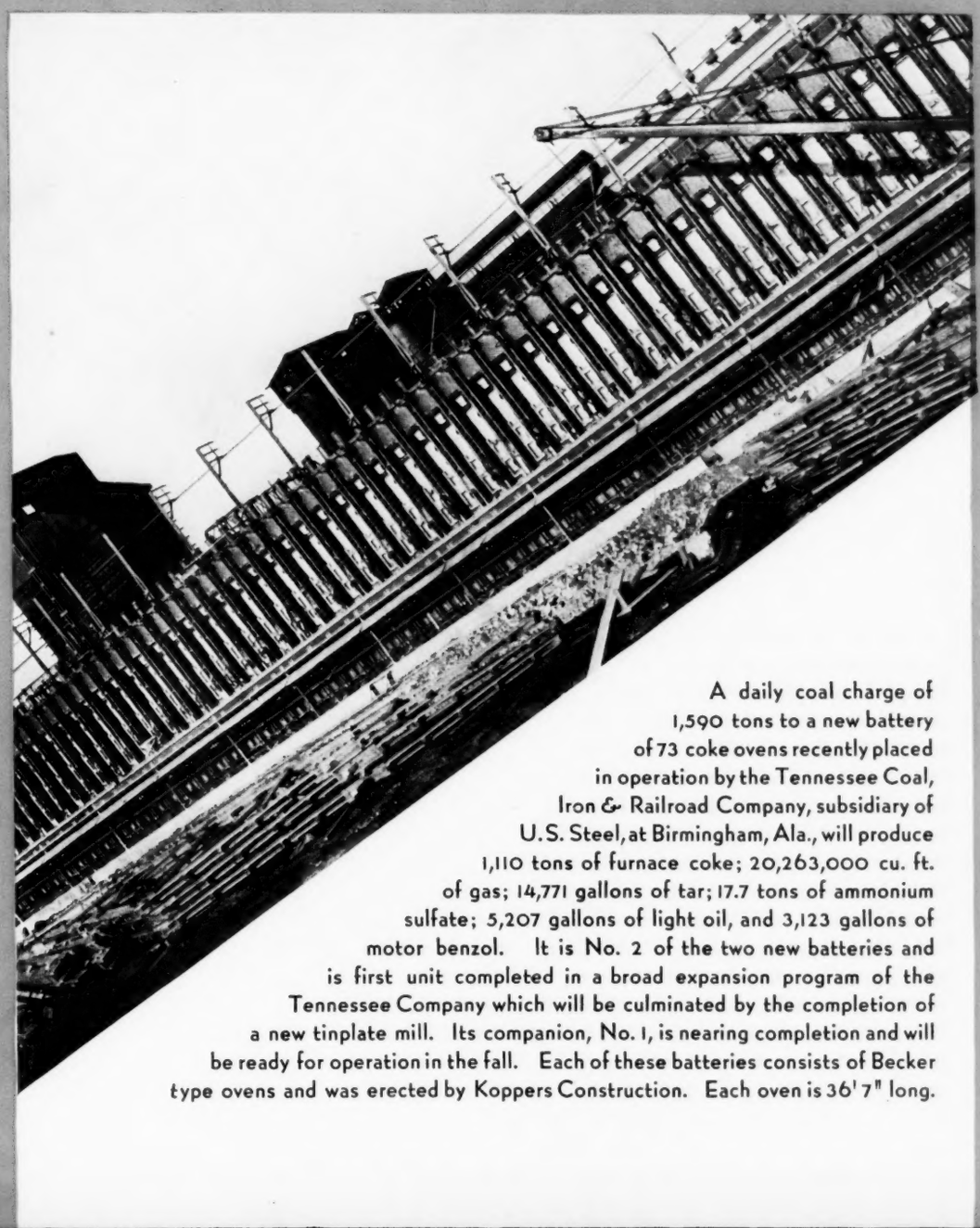
The Chemistry and Technology of Rubber by Carroll G. Davis, editor, and John G. Blake, associate editor, twenty-five contributors, A. C. S. Monograph, 74: Reinhold, N. Y., 941 pp., $15.

Though suffering somewhat from the duplication of material and conflicting ideas inherent to multiple authorship, nevertheless, intelligent and skilful editing has brought together an outstanding compilation of the up to date knowledge of rubber from both scientific and production points of view: an essential work in its field which stands alone in American rubber literature.

Comprehensive Index of the Publications of the Amer. Ass'n. of Petroleum Geologists by Daisy Winifred Heath: Amer. Ass'n. Petrol. Geologists, Tulsa, Okla., 382 pp. $3.

For the twenty volumes of this association's bulletins, 1917 to 1937, this book fulfills completely the promise of its title.

Plant Operation and Administration



A daily coal charge of 1,590 tons to a new battery of 73 coke ovens recently placed in operation by the Tennessee Coal, Iron & Railroad Company, subsidiary of U.S. Steel, at Birmingham, Ala., will produce 1,110 tons of furnace coke; 20,263,000 cu. ft. of gas; 14,771 gallons of tar; 17.7 tons of ammonium sulfate; 5,207 gallons of light oil, and 3,123 gallons of motor benzol. It is No. 2 of the two new batteries and is first unit completed in a broad expansion program of the Tennessee Company which will be culminated by the completion of a new tinplate mill. Its companion, No. 1, is nearing completion and will be ready for operation in the fall. Each of these batteries consists of Becker type ovens and was erected by Koppers Construction. Each oven is 36' 7" long.

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Plant Problems

Discussed at the A. C. S. Meeting

The following are abstracts of important papers on practical industrial subjects which were read and discussed at the recent meeting of the American Chemical Society, Rochester, N. Y., September 6 to 10

Automatic Control

By John J. Grebe
Dow Chemical Co.

The four necessary "things to go by" in the control of automatic regulation are:

1. Measure of the forces or flows that cause changes.
2. The observed deviation.
3. Amount of inertia or capacity to be overcome.
4. The time it takes to detect changes and to make corrections effective.

These four aids are used by the combination of four control elements or units to determine what should be done for any set of conditions. The mechanical thinking apparatus then calls for adjustment to be made by a motor or piston, more accurately than man can do. Fatigue and errors are eliminated.

A way of checking any control apparatus is explained which tells how good it is at performing its duties. A grading chart is presented that makes it possible to evaluate a control system in terms of fundamentals and to determine wherein it may be lacking.

Complicated chemical processes requiring very abrupt adjustments in order to keep conditions accurately on the line have been subject to this type of control for more than four years.

One of the great difficulties at present is that the more complete and accurate controls are still too expensive for common use. They will, however, become as common as the ordinary thermostat. The practical development of the principles herein described will greatly facilitate the use of such things as gyroscopic steering, anti-aircraft gun direction, car steering mechanisms and air conditioning controls.

Probability of Corrosion

By R. B. Mears and R. H. Brown
Aluminum Company of America

A new technique for studying corrosion mechanism has been developed whereby a large number of "identical" small metal specimens are exposed simultaneously to a definite corroding medium. By noting the percentage which show corrosion it is possible to study the effect of different variables on the chance of initial corrosion breakdown or corrosion probability. The corrosion probability thus becomes a measure of the excellence of the oxide, or other, film on the metal surface.

Previously, this technique had been applied in studying the corrosion behavior of iron and zinc. In the present paper the work is confined to aluminum. Discovery was made that the effect of the various factors studied, such as size of exposed metal area, concentration of salt in the corroding electrolyte, and change in temperature on the corrosion probability is similar to that found for iron, although, due to the more porous oxide film, smaller exposed areas and less corrosive solutions must be used in the case of iron. In addition, because of a different characteristic of aluminum, it was found possible to measure not only the corrosion probability but also the actual number of sites of attack on each specimen. As the area of the specimens grew larger, the average number of sites of attack per unit area decreased, although, in agreement with the work with steel, the corrosion probability increased. Such a decrease in the number of sites of attack would be expected from the Electrochemical Theory of Corrosion in those cases where the corrosion reaction is at least partially controlled by the cathode polarization.

A particularly interesting result was obtained when a large number of identical specimens were exposed simultaneously to the corroding liquid for a definite period of time. Some of the specimens were not attacked at all, some developed one and only one spot of attack, some two spots, some three and so on. When the specimens were grouped according to the number of pits which they developed and the depth of every pit was measured microscopically, the average depth of attack fell off as the number of pits increased. This finding is of special importance since it indicates that not always it is desirable to attempt to reduce the area of metal which becomes corroded in a certain environment. Sometimes it may be safer to increase the attacked area, as by the periodic removal of the protecting oxide film, in order to reduce the average depth of attack.

The results of this work clearly indicate that the corrosion of aluminum in neutral chloride solutions is at least partly electrochemical in nature.

Automatic Mixing of Gases

By H. J. Velten
Askania Regulator Co.

Most of the many manual and automatic devices developed in recent years for mixing gases and liquids in certain proportions can only be partially successful on account of the methods employed. Correct solution of this problem would be actually to measure the flows which are to be proportioned and control the volume of one or more components in such a way that a metered proportion is being maintained. Since the control itself cannot be any more accurate than its metering impulses, metering devices are new developments.

The power available from any metering impulse taken from orifice or venturi tube varies as the second power of the flow or velocity. Therefore at low flows this power is a minute value. In order to cover an appreciable flow range, it is essential that any flow or ratio control using this force as an actuating means should consist of a power relay that operates without weight or friction. A number of highly sensitive control relays have been developed for transforming these minute metering impulses into operating forces. The Askania jet pipe is one, and its principle is used for illustration.

It is a hollow pipe swinging around its pivot, operated by oil which enters the jet pipe through its fulcrum under high pressure, leaving the opposite end through a nozzle at high velocity. As the oil strikes exactly between two closely adjacent openings opposite the jet pipe nozzle, the velocity of the oil is transformed again into static pressure. The two receiving nozzles are connected with both sides of a power piston.

If the oil stream strikes the two receiving nozzles equally, the static pressure on both sides of the power piston is the same, but if the jet pipe is moved to the left or right a differential pressure is created on the piston which causes the piston to move and with it the control mechanism which is mechanically connected with the power piston. If the control is used with a single impulse system for maintaining pressure or flow, this impulse acts on one side of the jet pipe and is counterbalanced by an adjustable spring on the other side.

The jet pipe regulator as proportioning control is equipped with two impulse systems, one on each side of the jet, and the

forces transmitted by these impulse systems unto the jet are maintained in balance. The two impulse systems are flow metering devices. The jet pipe may be regarded as the pointer of a double flow meter which at the same time hydraulically operates the controlling mechanism.

Various impulse systems have been developed for proportioning flows of gases and liquids under various pressure and operating conditions. A new liquid metering device employs a positive displacement meter in connection with a transformer, the latter transforming the speed of the liquid meter into a pneumatic impulse proportional to the square of the flow. This pneumatic impulse is of the magnitude usually obtained with orifices in gas lines so that the same regulator can be used; *i. e.*, for proportioning combustion air to liquid fuel as well as to gaseous fuel.

Another frequent application of the proportioning control is for maintaining a ratio between more than two fluids. With three fluids, for instance, the primary and secondary flows are summarized so as to obtain one impulse representing the total flow of the two fluids and the third flow is proportioned in relation to the total of the primary and secondary flows.

In many cases, volumetric proportioning control is automatically corrected in accordance with changes in temperature or gravity of the flows or in accordance with changes in heat value of the gases to be mixed.

Continuous Adjustable Automatic Control

By H. M. Schmitt
Brown Instrument Co.

Three control systems, two electrical and one pneumatic, in which the control medium is continuously subject to regulation in response to changes of the measuring element are described.

Intermittent mechanical operations in automatic temperature controllers employing thermocouples as the measuring means have been eliminated by novel method of amplifying the unbalanced voltage of a potentiometric system of measurement. The unbalanced voltage is converted to alternative current by means of a neon light and selenium cell and amplified as alternative current by means of vacuum tubes to operate a reversible motor. The reversible motor drives a slide wire contact to rebalance the potentiometer measuring system and functions as the transmitter of a telemetering system for positioning a motor operated valve.

In a photo-electric system of temperature measurement, two photo cells are arranged in a bridge circuit. One cell is subject to radiation of the hot body, temperature of which is being measured, and the other is subject to the illumination of a calibrated lamp. The unbalanced voltage across the bridge due to differences in illumination between the photo cells is amplified to vary the current through the calibrated lamp and also regulate the movement of motor operated valves.

These systems are primarily applicable to automatic temperature control; however, a pneumatic system automatically controls such quantities as flow, pressure and liquid level in addition to temperature.

All three systems incorporate adjustments for varying the throttling range and rate of automatic reset to the control point, which can be made while the controller is in operation, thereby providing a means for adapting the same controller to processes having widely different characteristics.

Low Temperature Methods

By John G. Aston
Pennsylvania State College

The Low Temperature laboratory at Penn State College was started in order to obtain information that would enable calculation of the maximum amount of reaction between organic compounds from thermal data alone.

The work has so far consisted of the determination of the thermal properties of organic compounds from 11° above absolute zero (-440° F.), where the material is crystalline, up to the boiling point. The heat absorbed in melting and on vaporizing is also obtained as well as the vapor pressure of each substance under investigation.

To simplify this work relatively large quantities of liquid air and hydrogen are required. The liquid air plant makes 18-20 liters (4-5 gallons) per hour and the liquid hydrogen plant 12-18 liters (3-4 gallons) of liquid hydrogen per hour. These refrigerants are easily transferred through vacuum jacketed syphons.

In the calorimeter for measuring the heat required to raise the temperature of the substance the resistance of the electrical heater changes with temperature so that this heater serves as a thermometer. Heat leaks are prevented by suspending the calorimeter inside a heavy cylinder of copper and lead with a high vacuum between.

If the heat of formation and the entropy of formation of all important organic compounds were known over a range of temperature the maximum yield of any compound in a given chemical reaction could be calculated. The heat of formation can be calculated from the heat evolved when the substance burns while the entropy of formation can be calculated if one knows the way in which the compound, and the elements from which it is formed, absorb heat at all temperatures. This method of determining the entropy fails if the molecules are disordered in the crystal at low temperatures.

Recently M. Eidinoff of this laboratory has developed a very simple mathematical method of calculating the entropy of organic vapors assuming that these be made up of molecules whose constituent groups can freely rotate as well as vibrate. Because this method is based on sound statistical mechanical principles its correctness depends upon being able to determine the exact structure and mechanical behavior of the molecule.

The first work in the laboratory showed that the experimental value for the hydrocarbon, neopentane, was smaller than the theoretical value which is too high because it was assumed that the four methyl groups in neopentane could rotate freely while it is possible that the interaction between them hinders their rotation.

Methylamine gave similar results. Several other compounds are now under investigation.

In an effort to get information on the crystalline compounds the heat capacity measurements will shortly be extended to below 2° above absolute zero (-455.8° F.). This temperature can only be reached with liquid helium.

Most of the liquid helium plant is completed. It will make about five liters (1 gallon) per hour.

Also liquid helium will be made directly above a special calorimeter by expansion from a bomb containing compressed helium (1000-1800 lbs.) pressure and cooled to 11° above absolute zero (-440° F.). By this means a large fraction of the bomb can be filled with liquid helium which is used to cool the calorimeter.

Spectrochemical Analysis

By James S. Owens
Dow Chemical Co.

The important advantages of the quantitative spectrographic method for the analysis of materials for metallic and metalloid constituents have led to its regular use for the control of the production of many commercial products, including ferrous and non-ferrous metallic alloys, heavy chemicals, plastics, and pharmaceuticals. The speed of the method contributes markedly to the more rapid conclusion of research on new products and to the production of better materials through closer control of the manufacturing processes. The accuracy of spectrographic

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analysis of materials for elements occurring in concentrations of only a few thousandths of a per cent. is extremely valuable, for in many instances this method provides the only possible means of analysis.

The general field of application of analytical methods has been greatly extended by the demand for the control of the composition of chemical and metallurgical materials required by the development of new uses for these materials and by increasing purity consciousness on the part of the consumer. By the development of special equipment and technique spectrographic methods have been made particularly applicable for the control analyses of many of these materials.

Determination of the purity of pharmaceuticals, such as aspirin, epsom salt, and sodium and potassium bromides, is of extreme importance. Knowledge of the possible presence and concentrations of small amounts of metallic impurities, such as lead, iron, nickel, and copper, in these materials is necessary in order to avoid possible harm to the consumer or to avoid color produced in the product. Similarly the concentrations of these metals in cellulosic and styrene plastics are important factors in the water-whiteness of the resulting film or molded material. Spectrographic methods are well adapted for control analyses of these impurities.

Another field of application is the analysis of caustic soda for metallic impurities for use in the rayon industry. Such impurities include iron, silicon, aluminum, manganese, chromium, lead, barium, calcium, copper, nickel, and magnesium. The concentrations of these impurities are usually of the order of magnitude of from one part in one hundred thousand to one part in a million. The spectrographic method provides the only practical, accurate means of analysis for these impurities.

Spectrographic applications in the metallurgical alloys field are well established and the concentrations of the alloying constituents and the impurities of the alloys can be determined accurately and much more rapidly than by chemical methods. Production of magnesium metal and its alloys is almost completely controlled by spectrographic methods. The production of iron and aluminum is similarly controlled in many places.

Another interesting recent development has been its application to studies of the human body and its functions. Spectrographic analysis readily furnishes definite confirmatory information for the diagnoses of industrial poisonings by different metals and metalloids and of body deficiencies of various metals.

Success attained at the present time in various fields with spectrographic analytical methods, which are still in an early stage of development, gives promise of the continued increase in the accuracy and in the range of applications of these methods.

Another development which has aided in the solutions of several laboratory problems has been that of spectroscopic light sources appropriate for the analyses of different materials in which the constituents occur in concentrations varying from one part in a million to several per cent.

In order to increase the speed of quantitative analysis apparatus has been developed for rapid, graphical conversion of the strengths of the light emitted by different elements, as recorded on a photographic plate, into the percentage concentrations of those elements in a material. Use of this apparatus considerably reduces the time required for such conversion by arithmetical methods.

Rayon Boil-off

By Foster D. Snell
Foster D. Snell, Inc.

Waste ashes were used to replace expensive chemicals in the treatment of waste from a rayon knitting mill, whereby objectionable flavors in the milk of cows drinking from the stream were prevented and the stream itself, formerly white with waste, was turned into clear water.

The plant under discussion is a knitting mill operating solely on rayon. To handle properly in knitting, rayon is oiled or lubricated. When this lubricated rayon has been knit, the oil is removed by boiling off with soap and soda ash, leaving a white emulsion of oil and water.

The city of Sparta, in which the mill is located, has an activated sludge plant with a capacity approaching 0.4 million gallons per day. The dye wastes can be satisfactorily handled by this plant along with the normal sewage. The problem is therefore only one of treatment of the minor amount of boil-off waste. This has been as low as 15,000 gallons per day and is at present estimated at 60,000 gallons per day. A temporary expedient of discharging this waste into a nearby stream proved unsatisfactory.

By acidifying the boil-off and putting it through a centrifugal separator satisfactory results were obtained. The cost of treatment was not excessive but the cost of equipment would be large for handling such a small volume of waste. Methods of treatment with ferrous sulfate and lime or aluminum salts and lime were tried. While the waste could be clarified, the cost was very substantial and the finished effluent was quite strongly alkaline. Precipitation by lime was tried and was even more objectionable because of alkalinity.

The ingredients of the waste are mainly sodium carbonate, alkali metal soaps and emulsified mineral oil. Such an emulsion would be decomposed by conversion of the soap to an insoluble form. Experimental work indicated that addition of calcium chloride could be used to break down the boil-off liquor, giving a clear and colorless effluent. The process was tried out on a plant scale and operated satisfactorily with a pilot plant. The development of a simpler process rendered its complete installation unnecessary.

The use of ashes as a filter bed was developed with the cooperation of the State of Illinois Sanitary Water Board and proved to be simpler and less expensive. The effluent from the ashes contains considerable suspended matter at times but is much clarified from the original condition.

The ashes can be expected to contain substantial amounts of soluble heavy metal compounds, mainly lime. It is probable that these react with the soap similar to the reaction of calcium chloride. The stabilizing agent having been destroyed by this treatment, the emulsion is broken and precipitation of the oil results.

In practice the bed used is 3 feet deep and contains 1440 cubic feet or 30 tons of ashes. About one-third is replaced each week. Therefore each charge of 30 tons of ashes treats about one million gallons of boil-off. It is estimated that this volume of boil-off contains 6500 pounds of oils and 1500 pounds of soap, soda ash, etc. While this treatment has been in use for only about a year satisfactory results have been obtained up to the present time.

Low Temperature Measurements

By John F. Hicks, Jr., and Richard W. Blue
Massachusetts Institute of Technology

The conventional type of thermostat in use for the past thirty years in low temperature investigations consists of a large glass dewar tube for the liquid refrigerant—air, nitrogen, oxygen or hydrogen—in which is placed a vacuum tight vessel containing the apparatus. The apparatus is cooled by filling the dewar with liquid and allowing hydrogen or helium gas to transfer heat from the contents to the boiling liquid. Thermal isolation is accomplished by evacuating the cooling gas after the temperature of the apparatus attains the temperature of the bath.

The apparatus described in this paper was designed for specific heat measurements but is adaptable for a wide variety of low temperature investigations. It consists of an outside

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vacuum tight case of brass 8 inches in diameter and 36 inches tall. It contains a copper reservoir for liquid nitrogen and another for liquid or solid hydrogen. A floating radiation shield reduces the rate of evaporation of liquid nitrogen and a copper shield soldered to the nitrogen reservoir and surrounding the liquid hydrogen container serves to reduce the consumption of liquid hydrogen. The working space is enclosed by the cooled shield and situated just below the liquid hydrogen reservoir. It is in this space that substances are placed for study of their low temperatures. The intervening spaces are highly evacuated to isolate the apparatus thermally.

In order to cool various parts of this cryostat, thin walled poorly conducting German-silver tubes connect these parts with the liquid reservoirs. Liquid hydrogen is transferred into its reservoir where it evaporates at atmospheric pressure. Hydrogen gas at a pressure above atmospheric is admitted to the connecting tubes. It condenses to a liquid which runs down to the warmer apparatus in the working space and there evaporates. In this manner heat is transferred from the warm apparatus to the liquid hydrogen in the reservoir. This heat is absorbed by boiling away some of the liquid and the process continues until the apparatus is reduced in temperature to the boiling point of hydrogen—20° absolute or 263° below zero C. It is possible to reduce the temperature another 10° by allowing the hydrogen to evaporate at a pressure much lower than atmospheric.

Points of significant difference between the older system and the one herein described are as follows:

(1) Elimination of the large glass dewar.
Loss of refrigerant due to heat leaking into the apparatus from the mouth is a considerable item. Also the fact that these vessels are fragile has been the cause of some inconvenience in many instances. Perhaps the most important consideration under this heading is that the dewar tube often restricts the size and shape of the apparatus in the working space. In the present system, a very large working space may be refrigerated quite as well as a small one. At least, one is not so restricted.

(2) Elimination of supply of very pure helium.
Reflux cooling allows a good insulating vacuum to be obtained at room temperature and improvement of the vacuum upon cooling the apparatus. Frequently, impurities of the helium have been the cause of much delay with the gas conduction cooling system.

(3) Radiation shielding.
This factor contributes in the same manner as (1) does, namely, to decrease heat leak from the surroundings with consequent economy of refrigerant.

The significance of the above mentioned differences is that the present cryostat will increase the scope of cryogenic research. It allows the same amount of investigative work to be done with facility and with one third the refrigerant that was formerly required. That means that cheap small capacity systems for liquefying hydrogen and helium can accomplish as much as the large scale ones now in use.

Recovery CO_2 from Flue Gases

Greater efficiency in recovery of carbon dioxide from flue gases by absorption in alkali-carbonate solutions followed by addition of gaseous ammonia to the absorbers is claimed for the Macmar process developed by McKee and Winter, U. S. Patent 2,043,109. In principle, process consists in combining carbon dioxide in the gas phase with ammonia in the presence of water vapor. Process is said not to introduce odor or flavor into the purified gas. *Industrial & Engineering Chemistry*, Martin & Killeffer, June, '37.

Production Magnesium

By Thermal-Reduction Method

Present processes for production of magnesium metal, such as electrodeposition from solutions or from molten compounds containing magnesium or by sublimating from a mixture, contained in a retort, consisting of calcium carbide and a compound of magnesium, which is heated up with fuel or gas, are limited in their capacity.

Reduction of magnesium by smelting its ores or compounds with a reducing agent has been carried out in the presence of an inert gas or in high vacuum to prevent oxidation of the reduced metal. Where the reaction is carried out in an inert gas the process becomes expensive to operate chiefly owing to the cost of maintaining the inert gaseous atmosphere and the comparatively long smelting period employed. Where the reaction is carried out under vacuum the chief difficulty has been to maintain the reduced pressure at a reasonable cost, having regard to the high temperature of reduction (which is above the boiling-point of magnesium) and for a long enough time to obtain any considerable quantity of magnesium metal; particularly the arrangements for heating the reactive substances to be reduced have generally resulted in liquefaction of the charge which prejudices the possibility of obtaining a substantial recovery of the magnesium vapor.

The possibility of producing magnesium on a commercial scale is governed by a number of factors. Of these one of the most important is the securing and maintaining of an atmosphere which will not result in a reverse reaction between the magnesium vapor and any gases which may be present. Another factor in production is the speed at which the process can be carried on; if liquefaction of the ore and reducing agent can be obviated, then magnesium metal in vapor form can be freely given off. A further important factor is that the thermal efficiency of the reduction process should be as high as possible to obtain a good yield at small cost; and particularly with a sublimation process, the recovery of condensed metal can be accelerated by maintaining one portion of the apparatus (*i.e.*, where the magnesium ore is reduced) at a high temperature, and the other portion of the apparatus (*i.e.*, where it is desired to condense the substance) at a comparatively low temperature so that the temperature drop between the heated mix and the condensed metal shall be as large as possible.

According to E. P. 466,763, it is possible to obtain a high thermal efficiency in the process by heating the metal-bearing ore by intermixing it with a reducing agent which can be heated by induced currents so that a uniform and rapid heat is produced throughout the charge; and since the atmosphere above the mix is rarefied, it is possible to locate a relatively cold surface close to the charge being heated and to maintain that surface cool because the heat conveyed to the condensing surface is small. The relatively large temperature drop between the condensing surface and the heated reaction mix accelerates sublimation of the metal to be recovered.

The invention provides a continuous process in that the cold surface on which the distilled metallic vapor sublimes can be immediately removed when the charge is spent (for fusion of the condensate thereon), and a new cold surface or condenser located above the mouth of the crucible in which the smelting operation is carried on.

The process comprises mixing and reacting magnesium ore in subdivided form with a solid reducing agent in subdivided form and of such a character that transitory or eddy currents can be generated therein, by which currents the reducing agent is heated by high frequency induction, and heating the mix by high frequency induction of not less than 50,000 cycles per second to the temperature at which reduction of the magnesium ore and distillation of the resulting metal takes place and carrying out the reaction in a continuously evacuated container, the pressure

of the atmosphere within the container being maintained below the dissociation pressure—the term "dissociation pressure" is used to indicate the pressure present within the chamber in which the reduction process is carried on and which must not be exceeded for successful working, although the process is a splitting of the magnesium compound by heat and a reducing agent and not simply by heat alone—at the temperature of the mix of the magnesium ore being reduced.

The preferred reducing agents which are electrical conductors are: Graphitic carbon, silicon, aluminum, calcium, or alloys of the aforesaid elements; the preferred non-conducting reducing agent is a carbide.

One form of apparatus by which the process according to the present invention is carried out, comprises a crucible, for the ore to be reduced, and a reducing agent, located within the field of a high frequency induction coil, and a collector located above the mouth of the crucible and the interior of which is maintained under vacuum or partial vacuum by an exhaust pump. The collector is in the form of an inverted cone or dome, the exterior surface of which is maintained cool to permit the condensation of the magnesium vapor. Conveniently the collector is detachably mounted in an air-tight manner on the mouth of the crucible to permit a new collector to be substituted, and the old collector with condensed magnesium thereon removed for fusion of the condensed magnesium. A high frequency heating coil may be associated with the collector whereby the condensed metal can be fused and allowed to flow away therefrom. An internal channel may be provided in the interior of the collector at the lower part thereof, this channel being arranged to collect the fused magnesium metal condensed on the interior of the collector. Exit from this internal channel may be controlled by valve means so that the fused metal can be discharged directly into ingot molds. *Chemical Trade Journal*, July 23, '37, p. 72.

Recovery Practices from Smelter Gas

Results of investigations by R. S. Dean, chief engineer, Metallurgical Division, U. S. Bureau of Mines, on recovery practices from smelter gases are summarized:

1. No satisfactory process for recovering sulfur from stack gases without preliminary concentration has been found.

2. Three processes for such concentration have been proved on the pilot-plant scale. They use as absorbents: (*a*) ammonium sulfite-bisulfite; (*b*) basic aluminum sulfate; and (*c*) xylidine and sodium-carbonate solution. All these processes require cooling the stack gases; hence there is a loss of draught.

3. Formation of sulfate is a major problem in all three processes. It is removed as calcium sulfate in the first two and as sodium sulfate in the third.

4. Removal is much simplified, however, in the case of xylidine absorption, because the free base is insoluble in water, but the amount and value of reagent lost is greater in the xylidine process.

5. The reduction step presents fewer problems than the concentration step.

Details of the Guggenheim Ammonium Sulfite process and the Lenander patents (Norwegian) are given. Copies of report obtainable from the Bureau of Mines, Washington, D. C.

New Reaction for Aldehydes

A new reaction for aldehydes (*Farm Ital.*, 1926, *4*, 195), is based upon the development of colored products when condensed in an oxidizing medium with phenyl hydrazine or its homologs. Thus, benzaldehyde treated with methyl phenyl hydrazine yields a compound which, when hydrolyzed with boiling 5 per cent. sulfuric acid, yields a dihydrazine. The sulfuric acid solution of this substance has a red color. The reaction is useful for distinguishing between aldehydes and ketones as the change in color is not developed with ketones.

Scientific Treatment of Safety Problems

By Lammot du Pont

President, E. I. du Pont de Nemours & Co., Inc.

Under scientific treatment of the safety problem, the first thing is to find out how accidents happen; where, why, when and who. This means records covering all the facts pertinent to the accident. This is now substantially done in connection with traffic safety and in most of the larger industrial establishments, but there is a whole host of smaller industrial plants where few, if any, records are kept. This is probably due to the supposed cost of the record-keeping, which, of course, becomes relatively more serious with the smaller business.

The du Pont Company's experience indicates that, although safe tools, equipment and working places are essential, after these have been provided to a reasonable degree; that is, a degree which the average manager would insist on without question—most of the accidents which subsequently occur are due to not looking or not thinking. It follows, then, that we must educate our workmen to *look* and *think*. It is obvious that if we desire to make a workman watch his machine, so that he will not allow it to operate in a manner which will injure him, or somebody else, that we should not put up a sign LOOK AT YOUR MACHINE; for the presence of the sign induces him to refrain from looking at his machine. The same principle is involved in traffic safety.

Therefore, when education is to be undertaken, or when an effort is made to improve the thinking with respect to safety, it should be done at a time when the effort will not distract the mind of the individual when it should be concentrated on the work at hand. The kind of effort meeting these requirements is through leaflets, talks, rallies, lectures, published records, competitive contests and prizes.

In order to take advantage of the competitive spirit between plants, or departments of a large plant, several different types of safety contests have been employed by our Company to arouse and sustain employe interest in safety. One of the first contests which was inaugurated by the Company is known as the "Awards for No-Accident Records." This is an outgrowth of the original plan which went into effect early in 1923. At that time several du Pont plants and departments began to have long "no-accident" records, and Irenee du Pont, then President, agreed personally to recognize any record made by a plant of the Company which equalled or bettered a *rather remarkable one* which a certain plant had accomplished. This recognition, known as the "President's No-Accident Award," consisted of small prizes for each employe or a single group prize for the plant as a whole, depending upon the wishes of the employes. The goals for these prizes were based upon the plants, laboratories, or construction jobs operating certain definite periods without a tabulatable major injury. The classifications were determined by the number of exposure hours per month, each class being required to operate a certain number of calendar days without a tabulatable major injury. The goals established were thought at that time to be so high that they would be difficult to attain. However, in about five years nineteen plants equalled or bettered the so-called outstanding "no-accident" record. During the latter part of 1927 this particular plan was revised in order to provide additional goals so that the employes' interest might be retained after they had won the single prize.

The plan then became known as "The Awards for No-Accident Records" and three prizes were offered, a General Manager's Prize, a President's Prize, and a Board of Directors' Prize, which the plants could win in succession by extending their records. If the records were broken after winning either

of the first two prizes, the next prize could be won after the plant operated the required length of time for that prize.

In 1926 and 1927 a very constructive safety campaign was launched on du Pont plants known as the "Safety Poster Contest." Its object was to teach the employes to recognize unsafe conditions and unsafe practices and their proper remedy. Briefly, it consisted of a number of contest posters based upon the chief causes of major injuries which had occurred in our plants in past years and unsatisfactory plant conditions which were found by our fire and safety inspectors.

Following this, other contests were initiated, all with the idea of arousing and sustaining employe interest and at the same time educating them. The soundness and effectiveness of this activity has been proved, for the frequency rate has been reduced over 87 per cent. since 1925. In other words, the number of major or tabulatable injuries has been reduced from a little more than 26 per thousand employes in 1925 to about 4 per thousand employes during the first six months in 1937. Employment during this period increased over 400 per cent. This is positive proof that consistent, constructive effort and constant, co-operative effort, will prevent personal injuries.

Then, for several years an annual inter-plant contest, known as the "No-Accident Month," was held. This was extended to a three-month inter-plant contest in 1934 which became so popular that it was immediately followed by another three-month contest that same year. These contests produced some very remarkable results; for example, from 62 to 79 plants worked each contest period without experiencing tabulatable major injuries, which at that time was considered quite outstanding. However, these records have been materially bettered in more recent years.

The third type of contest which we have found effective was an Inter-Plant Contest for the "finding and elimination of unsafe practices" and the "uncovering and remedying of unsafe conditions." All plants, laboratories, construction jobs, warehouses, etc., participated. The contest extended from January 1 to June 30, 1935. During this contest, 11,685 unsafe practices were noted and reported by our employes (no foremen or other members of the supervisory staff were allowed to participate) and 11,255 were recorded at the end of the contest as having been corrected. Employes also reported 44,151 unsafe conditions which they noted in buildings where they worked or around the plant, and at the end of the contest 37,759 were reported as corrected.

You may ask what effect this contest had on our personal injury experience during the six month period. Without even mentioning the desirability of reducing personal injuries during this contest, the number of major injuries were reduced 50 per cent. (or one-half) as compared to the number occurring during the same six months period of the previous year. Therefore, it must be evident that the employes' recognition of, and reporting of, unsafe practices and unsafe conditions and their elimination or correction occupies a most important place in any safety program.

When considering "unsafe practices" do not assume that they are indulged in only by payroll or time clock employes. Those reported during the contest referred to, included supervisors as well as foremen; included operating procedure which had not been thoroughly studied, from the standpoint of safety, and which in some instances required employes to follow what a careful study indicated might be unsafe practices; included improper and poorly arranged equipment, the use of which involved undesirable or unsafe acts on the part of certain employes; as well as many unsafe practices which the employes themselves committed or saw their fellow worker indulge in. In the main, however, unsafe practices, which should be corrected, relate primarily to employes doing things thoughtlessly, carelessly, seldom intentionally, although disobedience frequently results in unsafe practices which have caused serious injuries.

Following are the results of these and many similar efforts: In order to judge the results, one must have a comparison of the record *after* the efforts have been made, with a similar record *before*. For this purpose, take the record of the years 1922 to 1926 inclusive, and compare that average with the record of 1936. The period 1922-1926 is selected not because it was one of particular success or failure; that is, not a period of good performance or bad performance, but it was about 1924 that the du Pont Company vigorously adopted a course of safety protection based on the effort to secure the effective co-operation of the men themselves. To show you that this period from 1922 to 1926 was not a bad period, compare its results with the average of three years from 1912 to 1914, which happens to be as far back as the record I have at the time, goes. During the 1912 period, the du Pont Company's fatality rate; that is, the number of fatalities per million hours work, was .94; whereas in the 1922 period, the fatality rate was .47; about half as great.

During the 1912 period, the frequency; that is, the number of major injuries per million hours work, was 36.78; whereas in the 1922 period, the frequency rate was 10.66; about one-third as great.

During the 1912 period, the severity rate; that is, the days lost through injuries per thousand hours work, was 8.16, and in the 1922 period the severity rate was 4.10, or about half as great as the earlier period.

Thus, you will note that during the period 1912 to 1922-1926, the accident record was improved by reducing the rate to one-half or one-third of what it had been. During this period, safety activity through the company was considerable, but we had not really gotten to work on this principle of co-operative effort.

Now, in comparing the records of the periods 1922 to 1926, with the year 1936, we find that the fatality rate was reduced from .47 to .07; that is, to about one-seventh of the former rate. The frequency rate was reduced from 10.66 to 1.80, or to about one-sixth of the previous record; and the severity rate was reduced from 4.10 to .53, or to about one-eighth of the previous record. Please note, and fix it firmly in your mind, that these reductions are not *by* one-seventh, one-sixth and one-eighth, but *to* those comparatively small fractions of the injuries that had been experienced before.

I have a comparative record of accident statistics of nine large industrial plants during 1925, as compared with 1936.

For these ten companies, among which the du Pont Company was included, the frequency rate fell from 21.30 in 1926 to 7.64 in 1936; a reduction to about one-third of what it had been. At the same time, the severity rate fell from 2.00 to 1.49; a comparatively small reduction. Thus, as indicated by comparison of du Pont with the *average* of these *nine* companies, there must have been something unusual in the accident prevention work conducted by our Company; and it is my firm belief that the difference is due to its effort to secure co-operation of the men; that is, to get the men to *thinking* about the problems themselves. That procedure is commended to anyone interested in any kind of safety work.

Some of you may be wondering if the results obtained from the safety work, carried on by the du Pont Company, constitute what might be called a good investment. The answer is "Yes." At the present time from 76 to 87 plants and operations operate each month without experiencing a time-losing injury. In addition, based upon the average annual frequency and severity rates over a six-year period from 1920 to 1925 inclusive, it is estimated that the improvement in safety during the eleven and one-half years following 1925 has prevented about 300 fatalities, over 500 permanent partial disabilities, and nearly 6,000 temporary disability major injuries. This reduction in suffering, maiming of employes, and loss of life, warrants all the time, effort and expense involved in carrying on the du Pont Company's work to prevent personal injuries.

Abstracted from an address delivered at the Regional Safety Conference Luncheon, sponsored by the Philadelphia Safety Council.

New Equipment

Cast Iron Paper Stock Valves

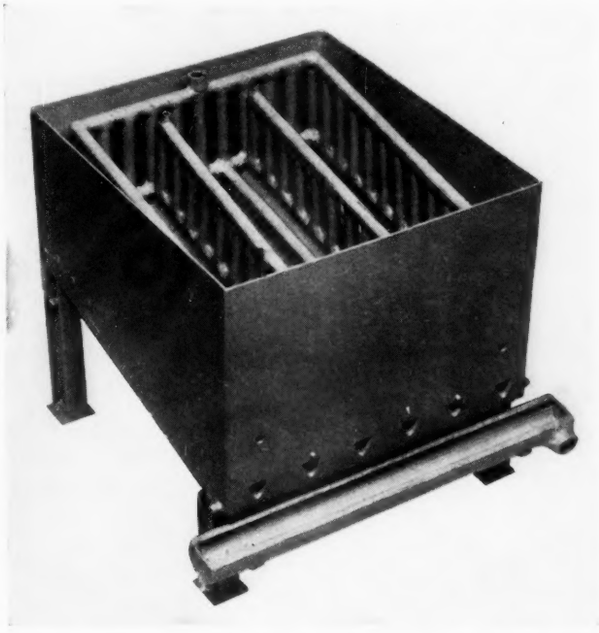
A new line of valves designed especially for controlling flow of pulp stock in pulp and paper mills, but also applicable in other industries where manufacturing processes require handling of fibrous solids suspended in water or similar fluids is being marketed by Crane Co., 836 So. Michigan Ave., Chicago, Ill. They are made and recommended for low pressure service—not over 60 pounds water, such as prevails on pulp lines.

Plastic Extrusion Press

Chief advantages claimed for the new hydraulic plastic extrusion press, now being manufactured by Hydraulic Press Mfg. Co., are: high production, saving of mold expense, and reduction of labor costs.

Sulfur Melter

An efficient and economical sulfur melter, a piece of equipment with unusual compactness and ease of operation, has been introduced by Texas Gulf Sulphur Co., and is known as the Tegul Sulfur Melter. It consists of a rectangular shell fitted with steam coils at its sides and in its interior. Lower part of shell is provided with inclined steam-jacketed V-shaped troughs, the



crests of which are about ten inches apart, and slightly above these troughs and directly over their centers are additional steam coils. Efficiency of melter is attributed to these V-shaped troughs and to the steam coils directly over their centers.

Sulfur is charged into a hopper over the melter and its weight presses it against the steam coils and heated troughs. The steam coils directly over the troughs prevent bridging and insure a constant feed of sulfur to the heated surfaces. The melted sulfur flows down the inclined V-shaped troughs and is discharged through openings in the side of the tank, before it is overheated and becomes viscous.

A melter occupying 36 square feet of floor space has a capacity of approximately three long tons an hour. It may be brought to full capacity in ten minutes and can be shut down even more rapidly.

"De-Ion" Power Fuse

For service in medium capacity generating stations and substations of all types, where the short circuit capacity does not exceed 630,000-3 phase kv-a, a new 34.5 kv., 200 ampere disconnecting type BA "De-ion" power fuse is announced by Westinghouse. This light weight fuse can readily be lowered to the ground for inspection or refilling. Complete operation of removing fuse from service, refilling, and restoring service, can be accomplished in less than one minute, which is of initial importance in cutting down outage time and loss of revenue.

Industrial Conveyer Roller

A new roller, designed for heavy-duty industrial conveyers, is constructed of 3½-inch O. D. seamless carbon steel tubing with a $\frac{5}{16}$-inch wall. The bearings, also of new design, have steel labyrinth seals, hardened ball races, and $\frac{3}{8}$-inch hardened steel balls, assembled within a pressed steel jacket. A hexagon axle, provides a means of locking the inner ball race, and has grease fittings applied at both ends. Mathews Conveyer Co., manufacturer, states that the roller, available in lengths ranging from six to 48 inches, has an average rated capacity of 2,000 lbs. per roller.

Pedestal Adjustable Motor Drive Lathes

Newly designed back-geared, screw cutting, precision lathes in the Pedestal Adjustable Motor Drive, available in five sizes 9″, 11″, 13″, 15″, and 16″ swing, and in bed lengths from 3′ to 12′—are announced by So. Bend Lathe Works, So. Bend, Ind.

The pedestal adjustable motor drive mechanism is a separate unit with the motor and countershaft mounted on a pedestal back of the lathe in a position horizontal with the headstock cone pulley of the lathe. Power is transmitted from the motor to the countershaft by V-belts, and from the countershaft to the lathe spindle by flat leather belt. This provides a smooth, steady pull, free from vibration and chatter.

Heavy Duty Lighting Unit

In order to provide and sustain maximum light output under severest service and atmospheric conditions, Millite lighting units are announced by Westinghouse. They are especially suitable for use in steel mills, foundries, cement plants, chemical plants, forge shops and similar heavy industry applications where moisture, smoke, dust, dirt, acid fumes or general hard use preclude the use of ordinary open type high bay units. The Millite is dust tight and vapor proof which makes it simple to clean and easily maintained. Reflector is treated by the Alzak process which retains its high efficiency permanently. There are no louvres or vents to cause a flue action which might deposit a film on the reflector and so impair efficiency of unit.

Non-Corrosive Filter Medium

Glastex, non-corrosive and heat-proof filter medium for use in Protectomotor Radial Fin Construction pipe line filters, is of tremendous value in certain industries. This latest adaptation of glass cloth by Staynew Filter Corp. opens up an entirely new field of use for Protectomotors in the filtration of high temperature or corrosive liquids and gases. Glastex is resistant to all acids except hydrofluoric, to all alkalis and gases and to temperatures as high as 600°F. In addition, tests prove that this incredibly tough, woven glass fabric possesses the highest efficiency in the prevention of the passage of foreign matter. It is unbelievably long wearing, and almost impossible to tear or wear it out.

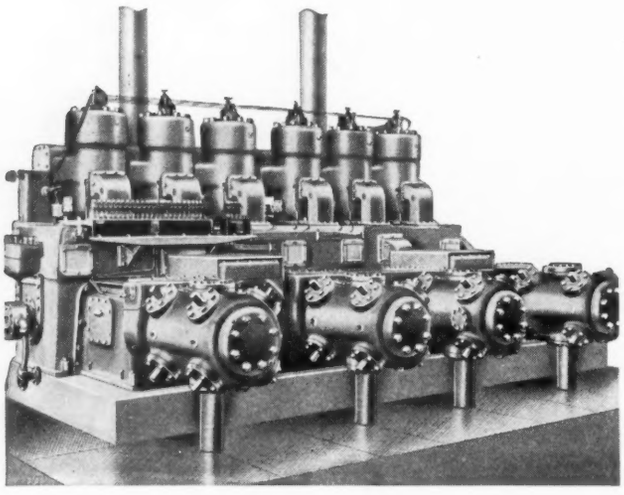
Bi-Optical Pyrometer

A combined color pyrometer whose invention is based on the use of light filters and color wedges which are transparent to a number of colors simultaneously is being manufactured by

Pyrometer Instrument Co., 103 Lafayette St., New York City. By using filters with a number of transparencies for separation, mixing, and toning down, any complicated optical or mechanical device for the production or combination of colors is rendered superfluous and creation of a surprisingly simple temperature measuring device in the form of colored discs is rendered possible. It is the only instrument for technical and scientific measurements by which the temperature of the "black body" and the "actual" temperature may be ascertained simultaneously. Instrument is furnished with scale ranges from about 900-1900°C. or 1700-3500°F., and may be used for innumerable laboratory and research applications including incandescent iron and iron alloys in the open and flame heated furnaces, etc.

Six-Cylinder Compressor

Clark Brothers, Olean, N. Y., are producing a big 6-cylinder, 600 H. P. size of their "Super--2-Angle" Compressor introduced a little more than a year ago. This compact right angle com-



pressor, while occupying much less floor space per horse power than horizontal types, includes all the desirable features of the horizontal compressor. The Clark Super-2-Angle fuel injection system is a feature of the new machine, as well as the special Clark scavenging method which provides 25 per cent. excess air for the power cylinders. This compressor is now offered in 2, 3, 4, and 6 cylinder sizes, ranging from 200 H. P. to 600 H. P.

Motors for Deep Well Pumping

Because of the growing demand for deep-well pumping equipment, General Electric has developed a new line of vertical hollow-shaft motors for pumping service. Outstanding among the many improvements embodied are a simplified oiling system for the top (thrust) bearing, a ball-type guide bearing, and more attractive appearance. In addition, the motors afford high full-load speed, adequate starting torque, high efficiency, double-end ventilation, and full mechanical protection.

Pyrometer Controller

For those who desire to automatically control temperatures of heat treating furnaces, melting pots or other heating devices at a definite pre-determined point, the "Alnor" Pyrometer Controller has been developed by Illinois Testing Labs., 420 N. La Salle St., Chicago, Ill. The principle of operation is electronic similar to a radio circuit. The pointer of the indicating pyrometer carries a small vane. An adjustable target is provided which carries two condenser plates or vanes. These vanes are the capacitive element of a tuned circuit. Except at the point when the temperature indicating pointer and the target coincide the circuit is unchanged. When the temperature pointer with its vane approaches the temperature setting, the vanes of the pointer and target interleave and produce a circuit change which in turn operates a relay.

Throttling Potentiometer Controller

Designed to provide close temperature regulation for heat-treating furnaces and similar applications, the new Throttling Potentiometer Controller, introduced by Foxboro Co., Foxboro, Mass., is controlled by an electrically-operated system which regulates the position of a throttling valve to maintain the flow of fuel required to hold the temperature constant within the throttling range. Thus, the upsetting effect of abrupt changes in fuel supply is avoided, and the temperature remains constant within a narrow control zone. It is known as model 4038.

Reclosing Fuse Cutout

A radically different fuse cutout, porcelain-housed and with reclosing features, is announced by General Electric. The reclosing mechanism is entirely in the door, which is so constructed that it is interchangeable with the door of present G-E 50-ampere indicating and drop-out cutouts, making it possible to convert the latter into reclosing cutouts by adding the new door.

Indicating Recording Pyromaster

Bristol's Indicating Recording Pyromaster, for recording and indicating thermocouple temperatures, new development of The Bristol Co., Waterbury, Conn., provides for direct marking on a 12-inch round-chart and scale indication on a large dial. It employs the potentiometer method of measuring electromotive force in terms of temperature, using standard thermocouples and extension leads, but operates on a new and simplified principle. The new instrument is available as a recorder, indicator, recorder with indicating scale, recorder controller, and as a recorder controller with indicating scale. Controllers are of either the pneumatic or electric type. Bulletin No. 489 describes these instruments.

Low Voltage Linestarters

New Westinghouse totally oil immersed linestarters known as low voltage type DNO, explosion-proof and corrosion resisting service, are designed for starting squirrel cage motors in oil refineries, chemical plants, paper mills, coke plants, cement mills, and in similar applications where either corrosive or explosive gases may be present. The combination starters provide, in one oil tank, complete corrosion-resisting motor control, motor disconnect switch and circuit protective device.

Refractories for High Temperature Furnaces

A new series of super refractories, known as "Monofrax," adapted particularly for use in high temperature furnaces and in contact with corrosive materials has been developed at Mellon Institute. "Monofrax" blocks are cast, by methods similar to those employed in foundry practice, from a melt produced in the electric furnace. Because of the non-metallic nature of their constituents, however, much higher temperatures are required than in casting iron, and the problems involved are therefore much more complex. Through the use of unique methods of forming the blocks, these obstacles have been largely overcome, with the result that this material is now available commercially.

These refractories have shown extraordinary resistance to erosive and corrosive attacks at high temperatures. They have proven to be particularly suitable for those uses in which a refractory is in contact with a high temperature melt, such as glass or slag. One of the preferred compositions, for example, is six times as resistant to the attack of glass at temperature of 2700°F. as the best refractory hitherto available.

Booklets & Catalogs

Companies whose booklets are reviewed on this page will be glad to supply readers of "Chemical Industries" with copies free, provided this magazine is mentioned and the request is made on company stationery. Your business title should also be given.

Chemical

Cadmium Water Dip Lacquer No. 3850, product summary details properties of this clear, cellulose type, air-drying lacquer which prevents oxidation, fuming or marring of cadmium plate. Roxalin Flexible Lacquer Co., Inc., Elizabeth, N. J.

Chemical Resistant Finishes, Blue Knight Roxyn C, complete description, summary of properties of this synthetic, air-drying or baking flexible lacquer. Roxalin Flexible Lacquer Co., Inc., Elizabeth, N. J.

Hydroxylamine Hydrochloride and Sulfate, booklet, data on uses of these materials in photographic developers, in treatment of skin diseases, and in organic synthesis as reagents or reducing agents. Allen E. Rogers Labs. Inc., 72 Grand ave., Brooklyn, N. Y.

Monsanto Current Events, September 1937, contains interesting biographical sketch on Life of Ira Remsen, Father of American Research, being fifth in series of contributions of outstanding chemists to science and industry; also article on Rôle of Phosphorus in Life. Monsanto Chemical Co., St. Louis, Mo.

National Farm Chemurgic Council, booklet, 16 pp., provides brief summary of the present work of the Council, its aims and purposes, particular attention is directed to chart on page 4, showing the interdependence of farm income and factory payrolls. Farm Chemurgic Council, Dearborn, Mich.

Sorbitol, 12 pp. booklet, gives highly instructive details on properties, uses and adaptations of this new industrial chemical whose unique physical and chemical properties adapt it to a wide variety of uses. Industrial Chemicals Dept., Atlas Powder Co., Wilmington, Del.

Thiokol Facts, Vol. 1, No. 8, latest developments in use of this remarkable oil-proof synthetic rubber; company also maintains free consulting service for prospective users. Thiokol Corp., Yardville, N. J.

Witco Products, special folder, supplement to larger and more complete booklet, lists some of the products supplied to various chemical consuming industries. Users of chemicals, pigments, and oils will find it useful as a reference list. Wishnick-Tumpeer, Inc., 295 Madison ave., New York City.

Equipment, Apparatus

Adsco Water Heaters, Bulletin No. 35-76, for industrial and institutional installations, includes Type E for gravity recirculation, submerged heater and condensate cooling service, and Type F for maintaining suitable water temperatures to prevent freezing in elevated steel or wooden tanks. American District Steam Co., No. Tonawanda, N. Y.

Aluminum News Letter, Sept. 1937, keeps users up to date on new trends in aluminum developments; August 1937, contains graphic article on Aluminum Sewage Disposal. Aluminum Co. of America, Pittsburgh, Pa.

Apparatus Topics, Sept. 1937, new and outstanding achievements in laboratory aids. Precision Scientific Co., 1730 N. Springfield ave., Chicago, Ill.

Friction Clutches, Catalog No. 1532, gives sizes, dimensions, weights, h. p. ratings, and other pertinent data on both Meeseco and Twyncone types; also tells how to select and order right clutch for the service. Link-Belt Co., 307 N. Michigan ave., Chicago, Ill.

Haynes Stellite Products in Oil Fields, booklet, revised edition, on complete procedure for hard-facing and hard-setting oil well bits with Haystellite, cast tungsten carbide diamond substitute. Haynes Stellite Co., Kokomo, Ind.

Heat, booklet, 48 pp., dramatic story of man's age-old struggle to control Nature's most powerful force, supplement to motion picture, "Heat and Its Control." Johns-Manville, 22 East 40th st., New York City.

Heat Transfer Apparatus, Bulletin 1625 K-Fin and G-Fin, on finned tube heat transfer apparatus, of special interest to operating executives and engineers of refineries and chemical process plants who meet obstacles in condensing vapors of viscous fluids or in heating or cooling fluids of low heat conductivity. Copies available to plant engineers and executives. The Griscom-Russell Co., 285 Madison ave., New York City.

Mechanical Topics, Vol. 1, No. 3, 1937, broad usefulness and new applications of company's line of nickel alloys described in this issue. International Nickel Co., 67 Wall st., New York City.

Potentiometer Pyrometers, indicating, recording and controlling, Catalog No. 1102, includes new Brown Electr—o—Line Controllers and the Brown Proportioning Control System, clearly illustrated by chart records, reproduced actual size. Brown Instrument Co., Wayne & Roberts aves., Phila., Pa.

Pressure Governors, Leaflet CR2922-E, for use with automatic starters for A-C and D-C motor driven pumps or compressors to maintain constant pressure between set limits on liquid or gas systems. General Electric Co., Schenectady, N. Y.

Radiostat, Folder 1518-A, electronic temperature control for stoker installations which achieves uniformity of temperature by balancing three different elements in its control. Link-Belt Co., 307 N. Michigan ave., Chicago, Ill.

Readco Chemical and Industrial Equipment, catalog, describes company's complete line of chemical mixers, acetylators, handling equipment, etc., and illustrates types of machine and adaptations. Read Machinery Co., Inc., York, Pa.

Rotary Displacement Meters, Bulletin 40-B12, describes general operating principles, lists meters for smaller volumes than in previous bulletins, and includes typical proof curves and illustrations of advanced meter design and installations. Roots-Connersville Blower Corp., Connersville, Ind.

Steel Hard-Facing Procedure, folder, data reprinted from April 1937 issue of "Oxy-Acetylene Tips," presenting instructions for applying hard-facing material, Haynes Stellite, to steel wearing surfaces, illustrations, sketches, and new, simplified procedure outlined. Linde Air Products Co., 30 E. 42nd st., New York City.

Synchro Diaphragm Control Valves, Bulletin No. 461, data on constructural features, operating characteristics, various types and applications to typical installations where temperature, pressure, liquid level, flow and humidity are automatically controlled. The Bristol Co., Waterbury, Conn.

The Activator, August 1937, contains second instalment of informative article on zinc-oxide printed in August 1936 issue. New Jersey Zinc Co., 160 Front st., New York City.

T. S. T. Triple Safe Tubing, Bulletin 365, describes flexible "Seamless" metal hose, used for steam, water, oil, gas, gasoline, paint, etc., pressure or vacuum, flexing, vibration, expansion, contraction; outstanding feature: tubing is cut in a few seconds and T. S. T. fittings are attached in less than 3 minutes; no braid to contend with. Simplex Co., 5-19 48th ave., Long Island City, N. Y.

Welding Piping Systems, 12 pp. illustrated booklet, advantages of welded joints in installation piping systems, of particular interest to builders, architects and engineers in this field. Linde Air Products Co., 30 E. 42nd st., New York City.

Equipment News

Personnel Appointments

J. M. McKibbin, Jr., associated with Westinghouse, has been made Apparatus Advertising and Sales Promotion Manager of the company.

E. Corning Faber has been appointed to the sales engineering staff of Oliver United Filters. He has had wide experience in the filtration field and was formerly associated with Filtration Engineers, Inc.

New Sales Offices

To supplement their San Francisco office and serve the Oakland area. The Linde Air Products Co. has opened a new sales office at 3710 San Pablo Ave., Oakland, Calif. This brings the total number of Linde offices in this country to 33.

A branch office in Baltimore has been opened by Steel & Tubes, Inc., subsidiary of Republic Steel, Cleveland. H. H. Smith will be in complete charge of office and entire line of products.

New Perchlorethylene Process

Perchlorethylene which is obtained when the vapors of pentachlorethane are passed over a hot contact material can be made more economically from tetrachlorethane by passing tetrachlorethane vapors mixed with chlorine over a hot contact material, the quantity of chlorine preferably not exceeding two atomic proportions for each molecular proportion of tetrachlorethane, according to a new German process.

The reaction proceeds with formation of two molecular proportions of hydrochloric acid for each molecular proportion of converted tetrachlorethane. The product contains practically no valueless higher chlorine substitution products, but merely in some cases small quantities of trichlorethylene or hexachlorethane.

As contact materials, dense bodies such as fragments of porcelain or glass, or porous materials, for example, varieties of charcoal such as wood charcoal, bone charcoal or active charcoal, or silica gel or the like, may be used. In the case of dense contact materials the reaction is best conducted at a relatively high temperature, say, a temperature approaching 450° C., whereas when a porous contact material is used it is generally possible to operate at a lower temperature, for example, at 300°—350° C.

It is said to be advantageous to use a porous contact material containing a catalyst known to promote the addition of chlorine or the splitting off of hydrochloric acid, for example, a chlorine derivative of a bivalent metal such as cupric chloride or the like. By the use of such a substance, alone or together with one of the above contact materials, it is possible to reduce the reaction temperature to 300° C. and even far below, for example, even to 150° C. New process is covered in E. P. 468,921.

DU PONT
REG. U. S. PAT. OFF

SODIUM

99.9% Purity

an important reagent for industrial chemistry

SODIUM is no longer a "laboratory" chemical. It is an important commodity in a number of large-scale industrial processes. It finds commercial use in the manufacture of heavy and fine chemicals, dyestuffs, anti-knock compounds, in metallurgy, and as an electrical conductor.

Chemically, Sodium is a valuable reagent for dehydrating, reducing, polymerizing, decolorizing, deodorizing, condensing and dehalogenating reactions. Physically, it is a soft, ductile, low-melting element, easily cut with a knife, with an extremely high conductivity for heat and electricity.

In spite of Sodium's marked reactivity, it is handled without trouble and its reactions are readily controlled when proper procedure is followed. It comes in the form of 12-pound molded bricks, packed 24 to a drum, and is available for prompt shipments in commercial quantities.

Investigate this reactive chemical. We shall be glad to supply standard methods of handling Sodium, and advise on particular details where you have a specific problem either in present production or for new products which you may be considering.

PHYSICAL PROPERTIES OF SODIUM

Atomic Weight	23.00
Form	Solid at room temperatures; soft and ductile
Color	Silvery-white
Melting Point, °C.	97.6
Boiling Point, °C.	880
Density: Solid at 0° C.	0.9721
at 97.6° C.	0.9519
Density: Liquid at 97.6° C	0.9287
at 880° C.	0.7414
Electrical conductivity, reciprocal ohms	
At 0° C.	19.84 x 10^4
At 100° C.	10.204 x 10^4
At 250° C.	6.7113 x 10^4
Thermal conductivity, cal./cm./sq.cm./sec.	
At 0° C.	0.335
At 75° C.	0.270
Specific Heat, Solid, at 0° C.	0.2930
at 97.6° C.	0.3266
Specific Heat, Liquid, At 97.6° C.	0.334
At 150° C.	0.3369
Heat of Vaporization, cal. /g. at 880° C.	1100
Heat of Fusion, cal. /g.	27.21
Critical Temperature, °C.	2000
Critical Pressure, atm.	343

In air- and water-tight steel drums

Methods of handling, preparation for special reactions, precautions, physical and chemical properties, some industrial uses and other information is included. Send the coupon for a free copy.

FREE INFORMATION ON PROPERTIES AND METHODS OF HANDLING SODIUM

E. I. du Pont de Nemours & Co., Inc.
The R. & H. Chemicals Department
Wilmington, Delaware

Gentlemen: Please send me complete information regarding the many uses and methods of application for Du Pont Sodium.

Name.....

Address.....

City.....State.....

DU PONT
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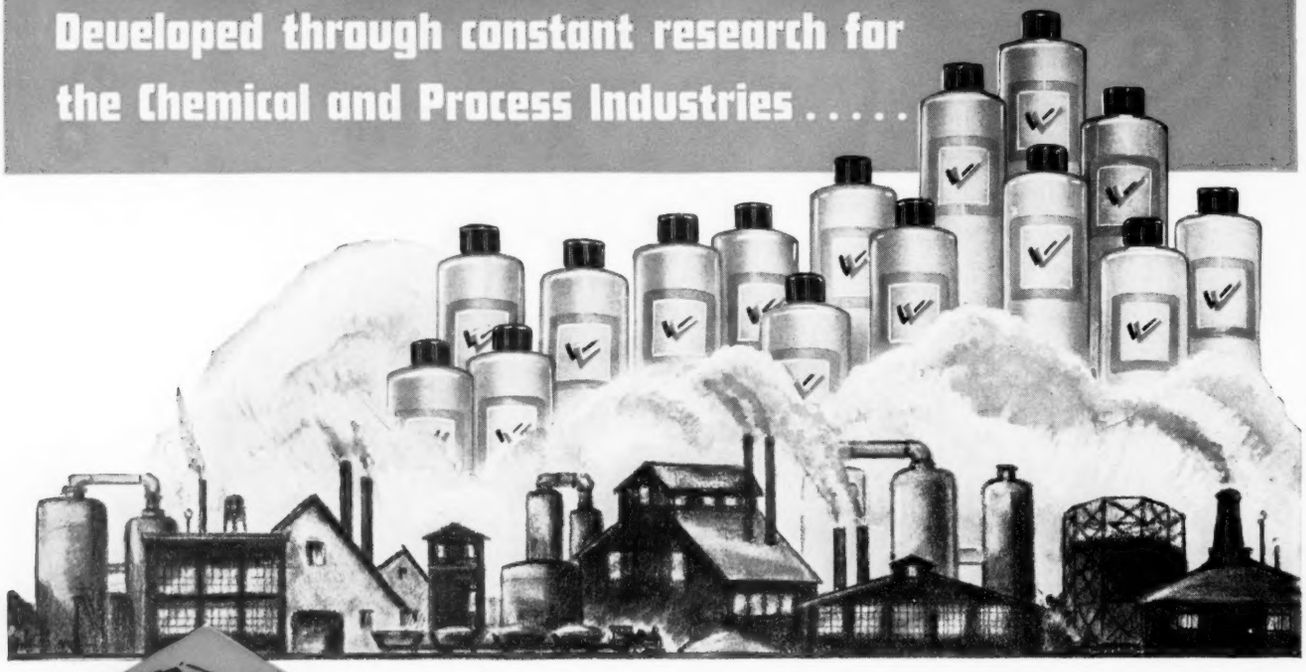

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Plastic Materials from Rubber and Tar

By Sir Gilbert T. Morgan & Dr. D. D. Pratt

AT the request of the Rubber Growers' Association, the Chemical Research Laboratory has recently carried out investigations on new applications of rubber, particularly in conjunction with tars and resins. In the course of this work rubber and its better known modifications have been used.

It was known that rubber was not compatible with high temperature tars and that although anthracene oil dissolves rubber, addition of pitch to such a solution caused immediate separation of the rubber. The problem, therefore, appeared to be that of developing a stabilizing medium for anthracene oil—rubber-pitch complexes.

The amount of rubber which can be introduced in one run through the Hurrell homogenizer varies with the type of oil. Low temperature tar oil can absorb 7 to 8 per cent. of its weight of rubber whereas 5 per cent. is the maximum for anthracene oil. The final clear limpid solutions, however, can be utilized as fresh starting material, and solutions containing up to 20 per cent. of rubber can thus be concentrated.

When pitch was added to samples of these solutions of rubber in tar oils, it was observed that whereas the mixtures obtained with low temperature and vertical retort oils were stable, the corresponding products containing high aromatic oils induced a separation of rubber in the form of a coagulum.

On the other hand high aromatic tar oils are unsuitable as a medium for pitch and rubber when the former is in greater concentration than 10 per cent. of the mixture, quite irrespective of the rubber content.

In seeking an explanation of the differences in behavior of these tars towards rubber, it is recalled that oils of low aromatic tars are chiefly paraffinoid, and substantially free from the crystalline constituents with which anthracene oil is saturated. It would appear that although the crystalline components of anthracene oil do play an important part in the stability of rubber and pitch mixtures in that oil, yet the paraffinoid oils of low temperature tar form a better medium than the wholly aromatic oils of high temperature tars.

Two possible methods for the preparation of stable complexes of high aromatic tars with rubber are, therefore, suggested. First, the utilization of a high aromatic oil not saturated with crystalline hydrocarbons obtained by refrigeration and filtration of anthracene oil, or by selection of a distillate such as "dead oil" distilling between the naphthalene and anthracene fractions. The second method of stabilization suggested is the dilution of a high aromatic tar by an oil substantially free from solid hydrocarbons.

Rubber-tar complexes similar to those derived from latex are obtainable from crepe rubber which, when milled in the presence of tar oils is converted into a plastic material containing approximately 80 per cent. rubber and 20 per cent. oils. All grades of Rubbone are readily compatible with the various types of tar, this incorporation being accomplished by heating the materials at 120° for one hour. The blended products are stable homogeneous liquids of increased viscosity and "stiction" as compared with the original tar.

Vulcanized rubber does not dissolve in tar oils, but forms dispersions which, however, by suitable manipulation can be obtained as gels. When vulcanized latex and tar oils are passed through a colloid mill at 100° C. water is removed and ultimately a clear gel is produced. Such gels are obtainable from vulcanized latex and oils from any type of tar and, furthermore, addition of pitch causes no separation of rubber. A series of results indicated that nitrite crumb is moderately compatible with high temperature tar. Longer treatment at 145° C. of the two components did not lead to any improved products. However, following the conditions described in B. P. 428,100 nitrite crumb was dissolved in tar oils and when pitch was subsequently added stable products containing up to 3.0 per cent. of the modified rubber were produced. When nitrite crumb was used in excess of this proportion coagulation invariably occurred. With tars of paraffinoid type nitrite crumb produces more satisfactory results.

Chlorinated rubber dissolves readily in tars or tar oils so that the blending of this rubber derivative with tars is quickly effected by heating a mixture of the components to 100° C. for 2 hours. The most noteworthy feature of the products so obtained is a high degree of elasticity which is a novel property for tar products. Chlorinated rubber has also been blended with vertical retort and with low temperature tars, but it was found that as the tar oils became increasingly paraffinoid so the stability of the final tar-rubber product decreased. It will be noted that the behavior of chlorinated rubber towards the various types of tars is the converse to that of natural rubber, being readily soluble in "aromatic" tars and less soluble in paraffinoid tars. The property of elasticity conferred by chlorinated rubber, particularly on horizontal retort and coke oven tars, may be attributed in part to the plasticizing effect of the tar oils on the rubber derivative and in part to the resinoid contents of the tar acting as a reinforcing "filler." Experiments were carried out on the drying properties of chlorinated rubber-tar products and it was concluded that the addition of small proportions of the rubber derivative accelerated the rate of drying of the tar.

An alternative method has been developed for the preparation of tar products containing chlorinated rubber. When chlorine was passed into solutions of rubber in appropriate tar media, or into dispersions of vulcanized rubber in any tar, products were obtained resembling those furnished by direct solution of chlorinated rubber in tars. It is to be noted that this method of chlorination *in situ* leads to a product consisting of chlorinated rubber in *chlorinated tar oils*. When pitch was added, with the aid of stirring at 120° C., to this material new blends of tar products were produced, exhibiting a high degree of elasticity.

Rubber hydrochloride behaves similarly to chlorinated rubber in combination with tars, being readily soluble in high aromatic tars to yield homogeneous, stable products, rather less elastic than the corresponding chlorinated rubber product. On the other hand, this new rubber hydrochloride-tar material possesses improved "stiction" so that its adhesion is superior to that of the chlorinated rubber-tar complex.

One of the chief applications of synthetic resins of the Bakelite type is in the production of insulating materials, and for this purpose the resin is used in conjunction with fillers such as wood meal. Up to the present very little use seems to have been made of rubber as a filler, although rubber itself is a very good insulating material. Experiments, however, suggest that vulcanized rubber may prove a most valuable accessory in combination with Bakelite resins.

A series of products ranging from 90 parts resin and 10 parts rubber to 10 parts resin and 90 parts rubber have been prepared by the following method. The vulcanized rubber was precipitated from Vultex (vulcanized latex) in fine particles by the addition of ethyl acetate, filtered, washed thoroughly with acetone to remove the last traces of water and dispersed in benzene. The measured solution of Bakelite resin in acetone was then added,

care being taken that the ratio of benzene to acetone was 3:1 and the mixed solvents removed under reduced pressure. In preparations containing up to 50 per cent. rubber, the material remaining after removal of solvents consisted of a thick homogeneous syrup which slowly hardened to a brittle mass as the last traces of solvent were removed. For molding purposes these materials were powdered and sieved. When the preparations contained more than 50 per cent. rubber they consisted of increasingly resilient materials which could be disintegrated, but not powdered. These rubber-resin complexes were molded under pressure at 150° C. to yield articles of increasing flexibility as the rubber content increased.

The incorporation of chlorinated rubber with Bakelite resin is effected by methods similar to those described in the case of the vulcanized material. In this case, however, the rubber derivative is dissolved in benzene, thus allowing a completely homogeneous blend with the acetone solution of resin. Results suggest that chlorinated rubber may prove to be superior even to vulcanized rubber as a filler in conjunction with Bakelite resin.

At present considerable quantities of chlorinated rubber are being imported mainly for use in the paint industry, but much attention is being given to the development of this material for insulating purposes, owing to its peculiar property of assuming a vesicular form. The expanded modification of chlorinated rubber is effected by submitting the material at 140° C. to pressure which is quickly released at the end of the molding period. At the Chemical Research Laboratory this property of chlorinated rubber has been extended to the production of a series of laminated products. Chlorinated rubber alone, or in conjunction with fillers such as asbestos can be molded into machineable products, but these materials are improved by the addition of small proportions of plasticizers such as butyl phthalate.

The increasing attention now being paid to chlorinated rubber led us to examine methods whereby this material might be produced without the intervention of solvents. It was found that liquid chlorine at —40° C. readily reacted with rubber to produce in 10 minutes a product containing 60 per cent. chlorine. By removing excess chlorine at —40° C. under reduced pressure it was established that this reaction between rubber and chlorine took place wholly at this low temperature. The effect of the liquid halogen is first to convert rubber to a jelly-like mass and thereafter, if sufficient time is allowed, to dissolve the rubber completely. This method of chlorination has been applied also to vulcanized rubber, nitrite crumb, Rubbone and with partial success to latex.

Abstract of paper presented to Midland Section of the Coke Oven Managers Association, Sheffield, England.

Miscellaneous

Use of Pectins in Sulfite Pulp

Following are results of investigations on presence and importance of pectins in sulfite pulp. Comparative stainings with ruthenium red (reaction for pectin) and malachite green (reaction for lignin) on various fibre stuffs and isolated lignins gave evidence of the existence of considerable differences between spruce wood, wood extract and lignins. Unbleached Chinese cotton which stained distinctly violet-pink with ruthenium red yielded, after being well beaten, papers responding strongly to the air bubble test. This may be taken as a proof of the importance of pectins for the formation of slime, since cotton which is free from pectin and does not give any stain with R.R. does not parchmentize. The pectin substances are characterized by their acid nature (carboxyl groups) and, according to investigations made by Ehrlich, through their basic substance, galacturonic acid. The author (*Papier Fabrikant*, 1937, 35, 22, 185-87, 1937) found pectin-like substances to be present in easy parchmentizing bleached sulfite pulps. In order to destroy the calcium salt of the pectolic acids the pulp was treated for thirty hours with two per cent. hydrochloric acid, then again stirred with one per cent. hydrochloric acid, washed by means of alcohol and ether, and finally dried in a desiccator. The fibrous residue was treated with boiling water for a period of six hours, and then filtered. The presence of pectins in the filtrate was proved by means of lead salts as well as by naphthoresorcin (reaction according to Tollens for uronic acids). In the manufacture of sulfite pulps suitable for parchmentizing, boiling acids are applied which have a high content of lime because the formation of different insoluble calcium pectates impedes the dissolution of pectin acids. Since pectins are sensitive to oxidizing agents they must be carefully preserved during the bleaching process by the application of low temperatures and short bleaching cycles.

Highly Inert Plastic

Synthetic yarn equipment that must function in corrosive chemicals, and car water-pump impellers that resist anti-freeze and cleaning compounds, are a few of the many new uses for Durez 77 SB, General Plastics' molding material. Unique among plastics for its inertness, it also resists frictional wear and permits machining operations without impairment of its water—and chemical—resistance. Its use on pump impellers proved that it wears better than metal, and its lighter weight and non-resonance reduce noise.

Pottery Coloring Process

A new process of direct coloring on pottery and porcelain wares has been found by the National Seto Experimental Station of Japan. Patent covering process has not yet been granted and details have not been divulged, but reports state that the coloring appears to be done by the mortise joint system, giving wares beautiful colors peculiar to them.

Water-Soluble Cellulose Ethers

A new method of alkylating cellulose, which consists of treating a solution of cellulose in a quaternary ammonium hydroxide with an alkyl halide or sulfate has been developed. The reaction proceeds smoothly at room temperature and is particularly useful in preparing water-soluble derivatives.

There is a striking difference between the degree of alkylation of these cellulose ethers and of the water-soluble cellulose ethers prepared by the use of alkali cellulose. By the new method, ethers containing only 0.6 to 0.7 methyl or ethyl group are soluble in water whereas the introduction of 1.2 to 1.6 groups is necessary by the alkali cellulose process. The explanation for this difference is that a more even distribution of alkyl groups is obtained when cellulose is alkylated in solution. A complete description of the method of preparation and theory of solubility is given by L. H. Bock, *Industrial & Engineering Chemistry*, p. 985, Vol. 29, No. 9.

Substitute for Olive Oil

A substitute for olive oil in lubricating wool, etc., which has been found as good and in some instances better than olive oil, is being marketed in England under the name Howard's Ester Oil This pale yellow liquid consists of an ester oil of a fatty acid and a cyclohexanol derivative. P. H. Anderson, *Textile Colorist*, 59, 444-5, 1937.

Soluble Oils

Hydroformed lubricating oils, obtained by the action of hydrogen on mineral oils, preferably containing appreciable amounts of naphthenic hydrocarbons, at 250 atm./460°-540° C. in the presence of a catalyst, are mixed with about five per cent. of an emulsifying agent, *e. g.*, triethanolamine oleate, to yield a "soluble" oil which, when poured into water, gives stable emulsions suitable for textile uses. Details given in E. P. 452,811 (International Hydrogenation Patents Co., Ltd.).

Oil and Fat Preservation

Oils, fats, etc. are prevented from developing rancidity by excluding light of wave-length 2,900-4,700 A, by means of a film of regenerated cellulose colored with a dye transmitting not more that 10 per cent. of these wave-lengths and not absorbing more than 50 per cent. of light of wave-length of 4,900-6,900 A, according to method given in E. P. 453,438 (Sylvania Industrial Corp.).

New Copper Acetoarsenite

New method for manufacture of copper acetoarsenite, outlined in Fr. Pat. 809,586, utilizes the reaction of arsenious oxide or a salt of arsenious acid with a solution of copper and ammonium acetate at a temperature of 90 to 100°C. The latter solutions are best prepared by treating a solution of acetic acid and ammonium acetate with copper in the presence of air.

Permanent Blacking Galvanized Sheet Metal

Permanent blacking of galvanized sheet metal through process which uses a solution of 138 parts manganese sulfate and 130.5 parts barium nitrate (sp. gr. 1,125) in which the metal is dipped several times is described in *Chemiker Zeitung*, No. 50, p. 519. The resulting coatings are said to be weather- and acid-resistant and do not peel off when hammered.

Pine-Needle Pectin

Searching for a substitute for apple pectin because apples are a perishable fruit, E. H. Elwell, chemistry student, University of Washington, boiled pine needles, strained the "juice," added citric acid, poured alcohol into liquid and obtained pectin.

Urea in Manufacture Artificial Snow

Consul Sydney B. Redecker, Frankfort-am-Main, reports alleged German process for producing artificial snow for decorative purposes from glass wool, alum and urea. Mixtures of other natural or synthetic fibers and crystalline substances, with the addition of urea, are mentioned as suitable for use.

High Solvency Aromatic Naphthas

High solvency aromatic naphthas, manufactured by Standard Oil of N. J., Bayway, N. J., are known as Prime Cut Solvessos. They are derived from prime cut or uncracked basic crude oil, show an unprecedented stability to light and long storage, and have solvent powers much greater than previous naphtha solvents produced from petroleum. Alkyds, phenolics and other synthetic resins are easily soluble in these new products, thus making them of interest to manufacturers of nitrocellulose lacquers and synthetic enamels.

Recovery Cellulose from Hardwoods

Processes for recovering cellulose from hardwoods have been successfully perfected by Brown Co., Berlin, N. H., according to Col. George A. Richter, chemical director of company.

Water Resistant Dextrin Paste

Dextrin paste when used as an adhesive sometimes fails under the influence of moisture. A method of reducing this tendency is suggested in E. P. 453,132 (International Patents Development Co.) by incorporating in paste a vegetable protein; *e. g.*, gluten; to make a homogeneous mixture from which the protein does not separate out.

Improved Tanning Process

Patent, relating to tanning processes and materials, assigned to Monsanto Chemical, particularly refers to improved process for tanning sole leather. It discloses new tanning compositions, and mentions that alkali metal polyphosphates may be used in tanning bath with great advantage as to time of tanning and character of product obtained. *Leather Manufacturer*, August 1937, p. 149.

New Plasticizers

Usefulness of pentachlordiphenyl and tetrachlordiphenyl as plasticizers in nitrocellulose lacquers is indicated in recent Russian experiments, according to *Chemical Trade Journal*, p. 188, Aug. 27, '37. Resultant films possess good mechanical properties, slight hygroscopicity, and good dielectric values.

Coffee By-Products

A successful experiment for the extraction of by-products from coffee is quoted in a report received from Germany by President of the Brazilian National Coffee Department, Senor Fernando Costa. It is claimed that 13 per cent. of first-class oil has been extracted from coffee beans comparable in properties with soya-bean oil, while the residue gives high-priced cattle feed. Intensive experiments are to be continued. Noted in *Chemical Trade Journal*, Aug. 27, '37, p. 188.

Ethylene Glycol—Cooling Medium

Use of ethylene glycol as a cooling liquid to replace water has reached the production stage according to the *Petroleum Times*, Aug. 7, '37, p. 182. The search for liquids of still higher boiling point has been continued, but the marked reduction in the drag of radiators and the relative reduction in power output of the engine caused by higher temperature operation has reduced the practical interest of this line of investigation.

Toluol from Waste Oil

Through a new process discovered by J. Ward Putt, retired army officer, and Dr. A. B. Doran, chemist, toluene or toluol may be extracted from waste crude oils, according to Los Angeles newspapers.

Textile Finish

A chemical which can be used on practically all kinds of textile fibers to give finishes varying, according to type of fabric and method of application, from a very attractive soft handle to a water-repellent, soft finish which will last throughout the useful life of the fabric, is announced by du Pont. In order to make the finish effective and permanent, severe laundering is required as one step in process of application, as a result of which it is practicable to use this finish only on fabrics dyed with fast colors or on undyed fabrics. New product, known as du Pont Permanent Water Repellent, will impart finishes resistant not only to washing, including treatment with boiling soap solutions, but also to dry-cleaning.

Month's New Dyes

Calco Chemical Co. announce Calcozine Brown 2-RXD, a new standard of Bismark Brown, especially adapted for use on leather, where the color is required to stay on the surface rather than to penetrate. This property is important when the color is used in combinations and it is necessary to obtain the full effect of the brown shade on the surface of the leather.

Calco has also added to its line ten Calcoloid Vat Pastes for dyeing, to be followed later by additional types now in process. These products have been developed to supplement the Calcoloid Vat powders for dyeing in the mill, where the use of paste is preferred over powder.

General Dyestuff offers: Mordant Yellow OD, a new chrome yellow, manufactured by General Aniline. It may be dyed either chrometopped, chromate or on a chrome mordant and produces bright, reddish yellow shades of very good fastness properties. Dyed according to silk white method, it exhausts very well, leaving silk effects clean. It is of good solubility and is not precipitated by acid; therefore, is very suitable for machine dyeing. Fastusol Green LGT is a direct dyestuff which produces a full green shade of very good fastness-to-light, and is remarkably fast to water, washing, and perspiration.

TEETH, TOO, MUST EAT!

As the world's largest manufacturers of food-grade phosphoric acid and its salts, it has been the good fortune of the Victor Chemical Works to play an important part in making these vital minerals . . . calcium and phosphorus . . . readily and economically available.

TO remain strong and healthy, teeth, too, must be fed. According to recent experiments, "dentalcaries (a breaking down of the tooth structure resulting in cavity formation) is likely to occur in experimental animals when the phosphorus content of the diet falls below 0.48% and the calcium content falls below 0.34%."

During the past few years both press and medical profession have stressed two undisputed facts: (1) the importance of an adequate intake of calcium and phosphorus, (2) that the average American diet is sadly deficient in these two vital minerals. As a direct result, pharmaceutical manufacturers have found an expanding market for tablets of calcium phosphate—an excellent source of calcium and phosphorus.

Other manufacturers have secured a new and effective "health" appeal by introducing a small amount of Victor Di or Tri Calcium Phosphate into their products. In many instances Victor Tri Calcium Phosphate not only serves as a valuable mineral supplement, but prevents caking and assures a permanently free-flowing product.

VICTOR *Chemicals*

VICTOR CHEMICAL WORKS

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U. S. Chemical Patents

A Complete Check—List of Products, Chemicals, Process Industries

Agricultural Chemicals

Production sodium urea, by reaction metallic sodium with urea in anhydrous liquid ammonia. No. 2,090,592. Ralph A. Jacobson to du Pont, both of Wilmington, Del.

Production substituted ureas; reacting an alkali metal urea with an acyl halide. No. 2,090,593. Ralph A. Jacobson to du Pont, both of Wilmington, Del.

Process granulating sodium nitrate, using ammonium nitrate. No. 2,092,054. Frank J. De Rewal, Camillus, N. Y., to Solvay Process Co., New York City.

Production ammonium sulfate in form of scales. No. 2,092,073. Arnold Jeltsch and Anton Stryzewski, Leuna, Germany, to I. G., Frankfort-am Main, Germany.

Cellulose

Method continuously bleaching fibrous, cellulosic material. No. 2,089,992. John Campbell, Lancelot O. Rolleston, and Geo. A. Smith, Glens Falls, N. Y., to International Paper Co., New York City.

Production cellulose acetate from cellulose fiber of chemical wood pulp and cotton; using sulfuric acid in process. No. 2,090,809. Geo. A. Richter to Brown Co., both of Berlin, N. H.

Method digesting cellulosic material. No. 2,091,513. Albert D. Merrill, Watertown, N. Y.

Process reducing acidyl content of an organic ester of cellulose; saponifying ester by means of a nitrogenous organic base in presence of an alkali metal salt of an alkaline reaction. No. 2,091,968. Henry Dreyfus, London, England.

Treatment organic compounds. No. 2,091,971. Henry Dreyfus, London, England.

Saponification organic esters of cellulose; same being effected by means of a nitrogenous organic base having a swelling action on the cellulose ester. No. 2,091,972. Henry Dreyfus, London, and Robert Wighton Moncrieff and Frank Brentnall Hill, Spondon, near Derby, England, to Celanese Corp. of America, corp. of Del.

Saponification cellulose esters. No. 2,092,006. Robert Wighton Moncrieff, Spondon, near Derby, England, to Celanese Corp. of America, corp. of Del.

Saponification organic esters of cellulose, wherein part of the saponification is effected by treatment with an organic base, and desired saponification completed by treatment with a mineral saponifying agent. No. 2,092,010. Robert Wighton Moncrieff and Frank Brentnall Hill, Spondon, near Derby, England, to Celanese Corp. of America, corp. of Del.

Electric conductor insulated with cellulose material. No. 2,092,477. Thos. R. Scott and Malcolm C. Field, London, England, to Western Electric Co., Inc., New York City.

Cellulose acetate composition, comprising cellulose acetate and an acetylated polysaccharide sugar, said film being characterized by homogeneity, flexibility and relative impermeability to moisture. No. 2,092,677. Louis E. Lovett, Cleveland Heights, O., to Industrial Rayon Corp., Cleveland, O.

Coal Tar Chemicals

Preparation condensation products of 2.3-hydroxynaphthoic acid derivatives. No. 2,089,971. Rudolf Lesser, Berlin, Germany, to General Aniline Works, Inc., New York City.

Preparation acid halides of carbazole-N-carboxylic acids. No. 2,089,985. Wm. L. Ruigh, Rahway, N. J.

Preparation diphenyl derivatives. No. 2,090,173. Karl Zahn and Kurt Schimmelschmidt, Frankfort-am-Main, Germany, to General Aniline Works, Inc., New York City.

Manufacture hydroxybenzofluorenones; treating with acid condensing agents orthohydroxy-diarylketones. No. 2,090,438. Gerald Bonhote to Society of Chemical Industry in Basle, both of Basel, Switzerland.

Production 2.3-hydroxynaphthoic acid derivatives. No. 2,090,603. Wolfgang Winkelmuller, Leverkusen-Wiesdorf, Germany, to General Aniline Works, Inc., New York City.

Production cyanhydrins from aliphatic carbonyl compounds and hydrocyanic acid in the liquid phase. No. 2,090,942. Reinhold Fick, Ludwigshafen-am-Rhine, Germany, to I. G., Frankfort-am-Main, Germany.

Preparation aliphatic acylamino-amino anthraquinone derivatives. No. 2,090,948. George Reeves, Henry Chas. Olpin, and Geo. Holland Ellis, Spondon, near Derby, England, to Celanese Corp. of America, corp. of Del.

Production trialkylamines, the alkyl groups of which contain up to 2 carbon atoms. No. 2,090,953. Karl Smeykal, Leuna, Germany, to I. G., Frankfort-am-Main, Germany.

Coking oven. No. 2,091,016. Carl Schumacher, Bochum, Germany.

Production 1, 3-dihalogen-2-mono-methylamino-anthraquinone, using formaldehyde and sulfuric acid in process. No. 2,091,235. Joseph Deinet, Milwaukee, Wis., to du Pont, Wilmington, Del.

Preparation dicarboxylic acid esters. No. 2,091,241. Hamline M. Kvalnes to du Pont, both of Wilmington, Del.

Preparation benzanthrone acrylic acid wherein acrylic acid radical is attached to one of the free peri positions of the benzanthrone molecule. No. 2,091,242. Ralph N. Lulek and Clarence F. Belcher, So. Milwaukee, Wis., to du Pont, Wilmington, Del.

Purification phthalic anhydride containing naphthaquinone. No. 2,091,289. Frank Porter, Syracuse, N. Y., to Solvay Process Co., New York City.

Production alkylated and aralkylated polyamino-anthraquinones. No. 2,091,481. Georg Kranzlein and Arthur Wolfram, Frankfort-am-Main, and Emil Hausdorfer, Hofheim in Taunus, Germany, to General Aniline Works, Inc., New York City.

Preparation tertiary butyl-phenol, reacting phenol with a poly-isobutylene in presence of a Friedel-Crafts catalyst. No. 2,091,565. Ralph P. Perkins and Howard S. Nutting to Dow Chemical Co., all of Midland, Mich.

Complex compound resulting from combination of one molecule of 2-phenyl-quinoline-4-carboxylic acid, at least one molecule of piperazine, and at least one mol. of 1-phenyl-2.3-dimethyl-4-dimethylamino-5-pyrazolone. No. 2,091,571. Frederick C. Schubart, Pittsburgh, Pa.

Apparatus for production reactive, easily inflammable coke by low temperature carbonization of fuel. No. 2,091,702. Joseph Daniels, Essen, Germany, to Koppers Co., corp. of Del.

Coking oven retort structure. No. 2,091,703. Fred Denig, Pittsburgh, Pa., to Koppers Co., corp. of Del.

Medium temperature carbonization of coal. No. 2,091,711. Hans August Koppers, Bochum, Germany, to Koppers Co., corp. of Del.

Production 2-amino-1-hydroxynaphthalene sulfonic acids. No. 2,091,743. Fritz Straub and Peter Pieth, to Society of Chemical Industry in Basle, all of Basel, Switzerland.

Preparation solid diazo salts. No. 2,092,359. Karl Schnitzpahn and Wilhelm Koch, Offenbach-am-Main, Germany, to General Aniline Works, Inc., New York City.

Preparation dioxazine compounds; heating in presence of an aromatic acid chloride of the benzene and naphthalene series a diarylaminoquinone compound. No. 2,092,387. Arnold Brunner and Karl Thiess, Frankfort-am-Main, Germany, to General Aniline Works, Inc., N. Y. City.

Preparation 1,4-dihydroxy-alkyl-aminoanthraquinone. No. 2,092,397. Karl Koeberle and Christian Steigerwald, Ludwigshafen-am-Rhine, Germany, to General Aniline Works, Inc., New York City.

Preparation N-anthraquinonyl amino-benzene arsonic acid. No. 2,092,425. Fritz Ullman and Ernst Friedheim, Geneva, Switzerland, to Society of Chemical Industry in Basle, Basel, Switzerland.

Preparation condensation products of the azobenzanthrone series. No. 2,092,517. Max Albert Kunz, Mannheim, and Gerd Kochendoerfer and Karl Koeberle, Ludwigshafen-am-Rhine, Germany, to General Aniline Works, Inc., New York City.

Hydrogenation primary aromatic amines; preparing cyclohexyl amine by treating aniline in liquid phase with hydrogen in presence of a reduced nickel catalyst. No. 2,092,525. Homer Adkins, Madison, Wis., and Howard I. Cramer, Cuyahoga Falls, O.

Preparation an alkyl-chloro-hydroxy-diphenyl in which the alkyl and chloro-substituents are attached to the hydroxylated benzene ring. No. 2,092,724. Edgar C. Britton, Gerald H. Coleman, and Lindley E. Mills to Dow Chemical Co., all of Midland, Mich.

Preparation 3-bromo-4-hydroxy-5-tertiary-butyl-diphenyl. No. 2,092,725. Edgar C. Britton, Gerald H. Coleman, and Lindley E. Mills to Dow Chemical Co., all of Midland, Mich.

Coatings

Coating composition, comprising a solvent containing cellulose derivative material, mixed with a composition containing chlorinated rubber. No. 2,090,140. John D. Murray to Murray Liquafilm Corp., both of Chicago, Ill.

Varnished cambric, varnish film consisting of mixture of linseed, China-wood oils, and a transparent cottonseed oil pitch. No. 2,090,623. Frederick M. Damitz to Irvington Varnish & Insulator Co., both of Irvington, N. J.

Treatment paper products, using homogeneous composition of paraffin wax and polymerized dihydronaphthalene resin. No. 2,091,180. Paul La Frone Magill, Niagara Falls, N. Y., to du Pont, Wilmington, Del.

Method and apparatus for pressure treatment. No. 2,091,641. Henri P. L. Laussucq, Reading, Pa., to Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.

Manufacture translucent sheet material with a matte surface, composed of a mixed organic ester of cellulose and a fully esterified cellulose higher acylate. No. 2,091,694. Ernest R. Taylor, Rochester, N. Y., to Eastman Kodak Co., Jersey City, N. J.

Protective backing for reflecting surfaces, coating composed of depolymerized chlorinated rubber. No. 2,091,714. Irving C. Matthews, Rochester, N. Y., to Eastman Kodak Co., Jersey City, N. Y.

Preparation ester of a phenolic-methylene resin and a carboxylic acid boiling above 200°C. No. 2,091,965. Oscar A. Cherry, Chicago, Ill., to Glidden Co., Cleveland, O.

Process completely coating surfaces of mineral granules, using pore penetrative coating including reaction product of the highly concentrated metallic chloride and metallic oxide components of an oxychloride cement type of reaction product. No. 2,091,991. Clifford L. Jewett to Minnesota Mining & Mfg. Co., both of St. Paul, Minn.

Method affixing a copper coating to strip ferrous stock. No. 2,092,018. Bert L. Quarnstrom to Bundy Tubing Co., both of Detroit, Mich.

Viscous metal adhesive can coating composition principal ingredient of which is a saturated hydrocarbon resin resulting from catalytic polymerization of a liquid olefin. No. 2,092,296. Vanderveer Voorhees, Hammond, Ind., to Standard Oil Co., Chicago, Ill.

Method reducing tendency to liver or agglomerate in coating materials containing a basic pigment and a film forming agent, by addition of malic acid. No. 2,092,300. Chas. Bogin to Commercial Solvents Corp., both of Terre Haute, Ind.

Manufacture veneered articles, applying thereto a urea-thiourea-formaldehyde resin composition containing alphacellulose and a curing catalyst of organic chemical character. No. 2,092,502. Carleton Ellis to Ellis-Foster Co., both of Montclair, N. J.

Method affixing copper coating to a ferrous metal object. No. 2,092,557. Bert L. Quarnstrom to Bundy Tubing Co., both of Detroit, Mich.

Colored coated roofing material. No. 2,092,567. Stephen G. Wright, Chicago, Ill.

Patents digested include issues of the "Patent Gazette," August 17 through Sept. 7 inclusive.

Dyes, Stains, etc.

Production anthraquinone dyestuffs. No. 2,090,023. Berthold Bienert, Leverkuesen-I. G.-Werk, Germany, to General Aniline Works, Inc., New York City.

Production azo dyestuffs containing metal in complex union. No. 2,090,432. Fritz Straub, Basel, and Hermann Schneider, Riehen, near Basel, Switzerland, to Society of Chemical Industry in Basle, Basel, Switzerland.

Colloidized vat dye; deflocculating a vat dye powder in presence of a hydrophilic autodispersibility producing protective agent. No. 2,090,511. Moses L. Crossley, Plainfield, Roy H. Kienle, Bound Brook, and Geo. L. Royer, Somerville, N. J., to Calco Chemical Co., Inc., Bound Brook, N. J.

Production polyazo dyestuff containing an alkylated naphthol. No. 2,090,938. Karl F. Conrad, Buffalo, N. Y., to National Aniline & Chemical Co., Inc., New York City.

Process dyeing fibers with indanthrone dyestuffs; first using aqueous solution of a disulfuric leuco ester of indanthrone in the azine form. No. 2,091,143. David Alexander Whyte Fairweather, Falkirk, and John Thomas, deceased, late of Polmont, Scotland, by Olive Morgan Thomas, Wilmslow, and Barclays Bank, Ltd., Manchester, England, executors, assignors to Imperial Chemical Industries, Ltd., corp. of Great Britain.

Chemical process dyeing animal fibers. No. 2,091,145. Norman Hulton Haddock, Frank Lodge, and Colin Henry Lumsden, Blackley, Manchester, England, to Imperial Chemical Industries, Ltd., corp. of Great Britain.

Production anthraquinone vat dyestuffs of the indanthrone series. No. 2,091,236. Joseph Deinet, Milwaukee, Wis., to du Pont, Wilmington, Del.

Production water insoluble azo dyestuffs. No. 2,091,358. Otto Goll, Leverkusen- I. G.-Werk, Rudolf Ritter Wolff, Cologne-Mulheim, Germany, and Felix Gund, Cologne-Rhine, Germany, to General Aniline Works, Inc., New York City.

Production azo dyestuffs. No. 2,091,367. Arthur Howard Knight, Blackley, Manchester, England, to Imperial Chemical Industries, Ltd., corp. of Great Britain.

Sulfur dyestuff preparations consisting of a sulfur dyestuff, an alkali sulfide, an alkali hydrosulfide, and an alkali metal salt of a sulfurized derivative of a nuclear-hydroxy-substituted aromatic compound. No. 2,091,417. Paul Schick and Christoph Kohl, Frankfort-am-Main-Fechenheim, Germany, to General Aniline Works, Inc., New York City.

Production water-soluble basic triphenylmethane dyestuffs. No. 2,091,463. Paul Wolff and Wilhelm Werner, Frankfort-am-Main, Germany, to General Aniline Works, Inc., New York City.

Mineral dye comprising a saccharose derivative of the group of chromium gluconate and chromium saccharate. No. 2,091,539. Clarence B. White, Montclair, N. J.

Production dyestuffs of the anthraquinone thio-ether series. No. 2,091,657. Berthold Stein and Walther Kuehne, Mannheim, Germany, to General Aniline Works, Inc., New York City.

Preparation alkyl and alkoxy-arylamino anthraquinone dyestuffs. No. 2,091,812. Norman Hulton Haddock, Frank Lodge, and Colin Henry Lumsden, Manchester, England, to Imperial Chemical Industries, Ltd., corp. of Great Britain.

Production monoazo dyestuffs. No. 2,092,075. Arthur Howard Knight, Blackley, Manchester, England, to Imperial Chemical Industries, Ltd., corp. of Great Britain.

Production disazo dyestuffs. No. 2,092,076. Arthur Howard Knight, Blackley, Manchester, England, to Imperial Chemical Industries, Ltd., corp. of Great Britain.

Manufacture azo dyestuffs. No. 2,092,143. Hugh Schweitzer, Leverkusen-Wiesdorf, Germany, to General Aniline Works, Inc., New York City.

Production mixed quinphthalone dye consisting of a condensation product of phthalic anhydride and a mixture of petroleum alkylated quinolines. No. 2,092,238. James R. Bailey, Austin, Tex., to Union Oil Co. of Calif., Los Angeles, Calif.

Production azo dyestuffs free from sulfonic and carboxylic acid groups. No. 2,092,398. Hans Krzikalla and Paul Garbsch, Ludwigshafen-am-Rhine, Germany, to General Aniline Works, Inc., New York City.

Preparation dyestuffs of the dioxazine series. No. 2,092,399. George Kranzlein, Heinrich Greune Max Thiele, and Frank Brunntrager, Frankfort-am-Main-Hochst, Germany, to General Aniline Works, Inc., New York City.

Production fast tints on vegetable fibers; dyeing with finely subdivided complex metal compounds of direct azo dyestuffs for cotton, said compounds being sparingly soluble to insoluble in water and dilute alkalies. No. 2,092,429. Fritz Straub and Walter Anderau to Society of Chemical Industry in Basle, all of Basel, Switzerland.

Explosives

Production ammonium nitrate and other fusible compounds. No. 2,089,945. John D. Converse, Shawinigan Falls, Que., Canada, Stanley L. Handforth, Gordon Heights, Del., and Geo. J. Harris, Mt. Royal, Quebec, Canada, to du Pont, Wilmington, Del.

Priming mixture for ammunition comprising lead salt of diazo amino tetrazole; a second percussion sensitive ingredient; an oxidizer, and a fuel. No. 2,090,745. Willi Brun, Bridgeport, Conn., to Remington Arms Co., Inc., corp. of Del.

Pyrotechnic composition producing pink smoke; comprising an oxygen yielding salt, a fuel, and an iodate. No. 2,091,977. Geo. U. Graff, Washington, D. C.

Fine Chemicals

Preparation 2, 4-dioxo-3, 3-dialkyl-tetrahydro-pyridines. No. 2,090,068. Ernst Preiswerk, Munchenstein, near Basel, and Otto Schnider, Basel, Switzerland, to Hoffmann-LaRoche, Inc., Nutley, N. J.

Production mixed carboxylic acid salts of bismuth, said salts being stable and well soluble in oils. No. 2,090,201. Walter Herrmann, Friedrich Hampe, and Walther Persch, Frankfort-am-Main, Germany, to Winthrop Chemical Co., Inc., New York City.

Preparation benzoyl methyl di (benzothiazyl 1-sulfide) compound. No. 2,090,211. Joy G. Lichty, Stow, Ohio, to Wingfoot Corp., Wilmington, Del.

Manufacture mercaptobenzothiazole by reacting aniline, sulfur and carbon bisulfide at superatmospheric conditions of temperature and pressure. No. 2,090,233. Harold P. Roberts, Akron, O., to Wingfoot Corp., Wilmington, Del.

Manufacture derivatives of 2,4-dioxo-tetrahydropyridine. No. 2,090,237. Otto Schnider, Basel, Switzerland, to Hoffmann-LaRoche, Inc., Nutley, N. J.

Preparation cyclic unsaturated ketones. No. 2,090,319. Albert Weissenborn, Dessau in Anhalt, Germany, to Winthrop Chemical Co., Inc., New York City.

Photographic dusting-on process; light sensitive material comprising base and thereon, as light sensitive matter, an acetal of an aromatic nitro-aldehyde of the benzene series and an aliphatic polyhydric alcohol. No. 2,090,450. Gustav Kogel, Baden-Baden, Germany.

Selective desensitizer; gelatine-silver-halide emulsion of reduced yellow-red sensitivity containing a purine. No. 2,090,607. Walter Dewey Baldsiefen, Raritan Township, Middlesex Co., N. J.

Preparation N-monomethyl-para-aminophenol and its sulfate. No. 2,090,651. Harold Von Bramer and Albert C. Ruggles, Kingsport, Tenn., to Eastman Kodak Co., Jersey City, N. J.

Purification N-monomethyl-P-aminophenol and its sulfate. No. 2,090,652. Harold Von Bramer, Albert C. Ruggles, and Edwin A. Robinson, Kingsport, Tenn., to Eastman Kodak Co., Jersey City, N. J.

Preparation alkyl and alkylamine esters of P-aminothiobenzoic acid and related compounds. No. 2,090,756. Harold L. Hansen, Chicago, and Leonard S. Fosdick, Evanston, Ill.

Recovery iodine; heating silver iodide with concentrated sulfuric acid. No. 2,090,866. Laurence E. Harrison, Prescott, Ariz.

Preparation water soluble salts of basic products, *e.g.*, imidoethers, imidothioethers, amidines, or derivatives. No. 2,091,257. Alfred Eckelmann and Ernst Koch, Frankfort-am-Main-Hochst, Germany, to General Aniline Works, Inc., New York City.

Photographic hardening developer, composed of a developing agent, an aluminum alum, a compound which furnishes in solution a water-soluble aliphatic acid anion, and a compound which furnishes in solution a borate ion. No. 2,091,689. Harold D. Russell, Rochester. N. Y., to Eastman Kodak Co., Jersey City, N. J.

Photographic developer, alkaline solution containing a primary aryl amine developing agent and a thiocyanate, simultaneously coupling oxidation product of the primary aryl amine developer with a color-forming compound. No. 2,091,713. Leopold D. Mannes and Leopold Godowsky, Jr., Rochester, N. Y., to Eastman Kodak Co., Jersey City, N. J.

Photo-mechanical resist. No. 2,091,715. Alexander Murray, Rochester, N. Y., to Eastman Kodak Co., Jersey City, N. J.

Production lauric-acetic-glyceride. No. 2,091,988. Leo Phillip Hubbuch, Wilmington, Del., and Raymond E. Thomas, Newburgh, N. Y., to du Pont, Wilmington, Del.

Preparation easily soluble derivatives of dialkylamino-alkylamino acridines. No. 2,092,114. Paul Emile Charles Goissedet and Robert Ludovic Despois, Choisy-le-Roi, France, to Winthrop Chemical Co., Inc., New York City.

Salts of amino acridines. No. 2,092,131. Fritz Mietzsch, Wuppertal-Elberfeld, and Hans Mauss, Wuppertal-Barmen, Germany, to Winthrop Chemical Co., Inc., New York City.

Production quinoline derivatives. No. 2,092,352. Heinrich Jensch, Frankfort-am-Main, Germany, to Winthrop Chemical Co., Inc., New York City.

Preparation halo alkyl azyl sulfides. No. 2,092,712. Albert M. Clifford, Stow, Ohio, to Wingfoot Corp., Wilmington, Del.

Glass and Ceramics

Process and apparatus for manufacture safety glass. No. 2,091,331. Wm. Owen to Pittsburgh Plate Glass Co., both of Pittsburgh, Pa.

Manufacture laminated glass, uniting two sheets of glass with an elastic polymer of an ester of the acrylic and methacrylic acids group. No. 2,091,615. Otto Rohm and Walter Bauer, Darmstadt, Germany, to Rohm & Haas Co., Phila., Pa.

Manufacture homogeneous commercial glass containing alumina, introducing kyanite into melt as a batch ingredient. No. 2,091,691. Samuel R. Scholes, Alfred, N. Y., to Celo Mines, Inc., Burnsville, N. C.

Industrial Chemicals, etc.

Continuous production ethyl alcohol. No. 20,474. Reissue. Floyd J. Metzger to Air Reduction Co., Inc., both of New York City.

Gas reaction apparatus. No. 2,089,937. Harry Bender, Antioch, Calif., to Great Western Electro-Chemical Co., corp. of Calif.

Manufacture salts producible by exothermic reaction and thermally stable at temperature of operation. No. 2,089,957. George J. Harris and John Douglas Converse, McMasterville, Que., Canada, to du Pont, Wilmington, Del.

Recovery sulfur from sulfurous gases. No. 2,090,072. Stanley Robson, Shirehampton, Bristol, and Morris Wm. Travers, Clifton, Bristol, England, to National Smelting Co., Ltd., London, England.

Wet purification of gases resulting from combustion of sulfur-containing fuel. No. 2,090,142. Gordon Nonhebel and John Lindon Pearson, Norton-on-Tees, England, to Imperial Chemical Industries, Ltd., corp. of Great Britain.

Gas washing process in which gases containing oxides of sulfur are washed with aqueous lime containing liquor saturated with respect to calcium sulfite and calcium sulfate. No. 2,090,143. Gordon Nonhebel and John Lindon Pearson, Norton-on-Tees, England, to Imperial Chemical Industries, Ltd., corp. of Great Britain.

Method of and apparatus for conducting catayltic reactions. No. 2,090,217. Henry F. Merriam, West Orange, N. J., to General Chemical Co., New York City.

Process reconditioning used waste. No. 2,090,260. Leo C. McNamara, Irvin M. Conway, Wm. T. Bissell, and Herschel H. Harold to Journal Box Servicing Corp., all of Indianapolis, Ind.

Production magnesium sulfide from magnesium chloride. No. 2,090,446. Daniel Gardner, Rueil-Malmaison, France, to Studien- und Verwertungs-Aktiengesellschaft, Neehausen, Switzerland.

Preparation dialkylaminoalcohols; reacting a monoalkylamine with a dialkyl sulfate, both being of the lower aliphatic series. No. 2,090,485. Granville A. Perkins, Charleston, and John H. Purse, So. Charleston, W. Va., to Union Carbide & Carbon Corp., New York City.

Apparatus for bodying tung oil. No. 2,090,586. Julian P. Ward, Cleveland, O.; Frank Pelton, administrator of Julian P. Ward, deceased, to General Coating Co., Cleveland, O.

Preparation acyl ureas by reaction an alkali metal urea with an ester of a carboxylic acid. No. 2,090,594. Ralph A. Jacobson to du Pont, both of Wilmington, Del.

Preparation amido derivatives; reacting an ester of a long chain fatty acid with an alkali metal nitrogen compound in presence of a catalyst. No. 2,090,595. Ralph A. Jacobson to du Pont, both of Wilmington, Del.

Production a monomeric alpha-methacrylyl urea; by reaction an ester of monomeric alpha-methyl acrylic acid with a sodium urea. No. 2,090,596. Ralph A. Jacobson to du Pont, both of Wilmington, Del.

Method separating cineols from hydrocarbons of similar boiling range. No. 2,090,620. Carlisle H. Bibb to Newport Industries, Inc., both of Pensacola, Fla.

Process of an apparatus for extracting elemental sulfur from ore. No. 2,090,667. Henry M. Crowther, Los Angeles, Calif.

Method graphitizing carbon bodies. No. 2,090,693. Romie L. Melton to Carborundum Co., both of Niagara Falls, N. Y.

Process drying acid-activated clay by treatment with superheated steam. No. 2,090,741. Ernest W. Zublin to Texas Pacific Coal & Oil Co., both of Fort Worth, Tex.

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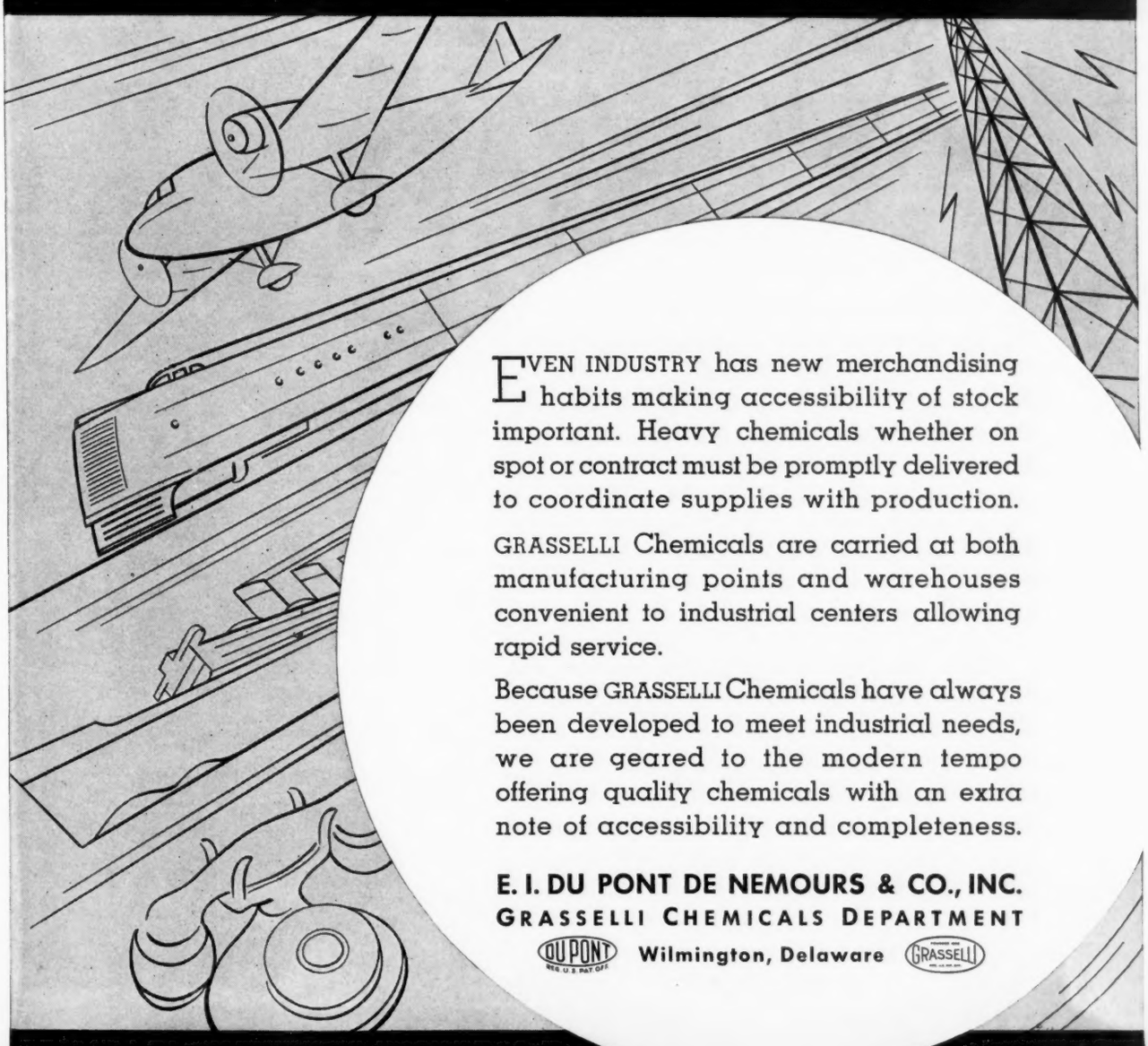

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Production sulfur through reduction of gases containing sulfur dioxide. No. 2,090,797. Axel Rudolph Lindblad, Djursholm, Sweden.

Apparatus for separation of mixtures of liquids of different specific gravity. No. 2,090,813. Carl August Schumacher, Leuna, Germany, to I. G. Frankfort-am-Main, Germany.

Purification sulfur dioxide bearing gases. No. 2,090,828. John W. Beckman, Oakland, Calif.

Device for controlling flow ratio of a liquid and a gas. No. 2,090,921. Nicolay Titlestad to Chemical Construction Corp., both of Charlotte, N. C.

Organic mercury compounds of the formula $(RHg)_nR_1$. No. 2,090,927. Carl N. Andersen, Watertown, Mass., to Lever Bros. Co., corp. of Me.

Contact sulfuric acid process. No. 2,090,936. Cyril B. Clark, Scarsdale, N. Y., to American Cyanamid & Chemical Corp., New York City.

Recovery ammonia and amines from their salts with organic acids. No. 2,090,941. Henry Dreyfus, London, and Horace Finningley Oxley and Edw. Boaden Thomas, Spondon, near Derby, England, to Celanese Corp. of America, corp. of Del.

Separation salt of ammonia with acetic acid into its constituents, first thermally decomposing salt in presence of an alkali metal acetate. No. 2,090,947. Horace Finningley Oxley and Edward Boaden Thomas, Spondon, near Derby, England, to Celanese Corp. of America, corp. of Del.

Apparatus for thermal treatments. No. 2,091,034. Geo. R. Duncan, Oak Terrace, Minn.

Electrochemical production of peroxides. No. 2,091,129. Ernst Berl, Pittsburgh, Pa., to Mathieson Alkali Works, Inc., New York City.

Production hydrogen peroxide. No. 2,091,130. Ernst Berl, Pittsburgh, Pa., to Mathieson Alkali Works, Inc., New York City.

Stabilizing hydrogen peroxide solutions with pyrophosphoric acid plus a tin compound. No. 2,091,178. Harvey N. Gilbert and Jos. S. Reichert, Niagara Falls, N. Y., to du Pont, Wilmington, Del.

Preparation salt mixtures; producing an alkali metal. No. 2,091,179. Robert Edwin Hulse, Niagara Falls, N. Y., to du Pont, Wilmington, Del.

Stabilization alkali metal silicates to produce an alkali metal silicate that is granular, free-flowing and non-caking; preparing fluid mass of sodium silicate and water, mixing undissolved starch therewith, solidifying and comminuting mixture. No. 2,091,202. Geo. W. Hallock and Ebenezer Skinner, Bloomfield, and James Cardell, Wood Ridge, N. J.

Method distilling solutions to obtain hydrogen peroxide. No. 2,091,218. Heinrich Schmidt, Waldorf, Germany, to Pennsylvania Salt Mfg. Co., Phila., Pa.

Recovery sulfuric acid in saccharification process. No. 2,091,309. Henry Dreyfus, London, England.

Preparation acetals of *b*-ketoaldehydes. No. 2,091,373. Johannes Nelles, Leverkusen-Schlebusch, Germany, to I. G., Frankfort-am-Main, Germany.

Manufacture secondary and tertiary alkyl derivatives of phenols by alkylation. No. 2,091,483. John F. Olin to Sharples Solvents Corp., both of Phila., Pa.

Improved method treating an argillaceous substance having low plasticity to increase plasticity thereof. No. 2,091,548. Harold L. Kauffman, Warren, Pa.

Manufacture aromatic compounds containing selenium, nitrogen and sulfur. No. 2,091,573. Ernst Theobald, Berlin, Germany.

Separation gaseous azeotropic mixtures of ammonia and trimethylamine, by treatment with water. No. 2,091,630. Merrell R. Fenske, State College, and Chester E. Andrews, Overbrook, Pa., to Rohm & Haas Co., Phila., Pa.

Recovery trimethylamine from mixture of ammonia and trimethylamine. No. 2,091,636. Paul Herold, Werner Wustrow, and Heinrich Wetzel, Leuna, Germany, to I. G., Frankfort-am-Main, Germany.

Process preparing activated wood charcoal and recovering manganese from pyrolusite. No. 2,091,696. Harold Von Bramer, Kingsport, Tenn., to Eastman Kodak Co., Jersey City, N. J.

Preparation precipitate containing titanium-oxygen compounds; precipitating by thermal hydrolysis titanium hydroxide from a titanic salt solution in presence of a finely dispersed inorganic titanic salt. No. 2,091,799. Paul Weise, Leverkusen-I. G.-Werk, Germany, to National Lead Co., New York City.

Method hydrogenating esters. No. 2,091,800. Homer Adkins, Karl Folkers, and Ralph Connor, Madison, Wis., to Rohm & Haas Co., Phila., Pa.

Recovery sulfur from an underground deposit. No. 2,091,829. Fred M. Nelson, Newgulf, Texas, to Texas Gulf Sulphur Co., corp. of Tex.

Apparatus for performance of chemical or metallurgical reactions. No. 2,091,850. Kurt R. Gohre, Frankfort-am-Main, Germany, to American Lurgi Corp., New York City.

Apparatus for testing viscosity of liquids. No. 2,091,896. Leo Ubbelohde, Berlin-Charlottenburg, Germany.

Method effecting precipitation of crystallizable impurities from solutions. No. 2,091,898. Wm. C. Weber, Larchmont, N. Y., to Dorr Co., Inc., New York City.

Treatment tungsten carbide. No. 2,091,903. Henry T. Baggett and Gorham W. Woods to Hughes Tool Co., all of Houston, Tex.

Method and apparatus for carrying out chemical reactions. No. 2,091,981. Chas. W. Hanson, Plainfield, N. J.

Production lower alkyl chlorides. No. 2,091,986. Lee Cone Holt and Herbert Wilkens Daudt to du Pont, all of Wilmington, Del.

Apparatus for controlling chemical reactions. No. 2,092,017. Thos. B. Prickett, Woodbury, N. J., to Houdry Process Corp., Dover, Del.

Preparation cyclic esters by polymerization of the corresponding linear polyester by heating under vacuum. No. 2,092,031. Edgar W. Spanagel to du Pont, both of Wilmington, Del.

Process of and catalyst for oxidizing combustible gases. No. 2,092,059. Jos. C. W. Frazer, Balto., Md.

Preparation alkaline silica gel by bringing about reaction between a diluted aqueous alkali metal silicate solution and a mineral acid. No. 2,092,163. Edw. S. Johnson, Wellesley, Mass., to Calco Chemical Co., Inc., Bound Brook, N. J.

Apparatus for reacting organic web materials with liquefied reagents. No. 2,092,306. Erich Gebauer Fuelnegg, Evanston, Ill., Eugene W. Moffett and Henry F. Irving, Gary, Ind., to Marbo Patents, Inc., corp. of Del.

Production organic peroxides. No. 2,092,322. Franz Rudolf Moser, Amsterdam, Netherlands, to Shell Development Co., San Francisco, Calif.

Production alkali metal nitrates by reaction of alkali metal chlorides and nitric acid. No. 2,092,383. Heinrich Tramm, Oberhausen-Holten, and Walter Grimme, Oberhausen-Sterkrade-Nord, Germany, to Ruhrchemie, Aktiengesellschaft, Oberhausen-Holten, Germany.

Production sulfur, reacting a gas comprising hydrogen sulfide with a gas comprising free oxygen. No. 2,092,386. Hans Baehr and Helmut Mengdehl, Ludwigshafen-am-Rhine, Germany, to I. G., Frankfort-am-Main, Germany.

Production solid, easily soluble formaldehyde. No. 2,092,422. Erich Naujoks, Mainz-Mombach, Germany, to Deutsche Gold und Silber, Scheideanstalt vormals Roessler, Frankfort-am-Main, Germany.

Production trimethylamine, passing gaseous mixture containing methanol and a methyl amine over metal oxide dehydrating catalysts. No. 2,092,431. Lloyd C. Swallen and Jerome Martin to Commercial Solvents Corp., all of Terre Haute, Ind.

Manufacture condensation products from aliphatic organic compounds. Nos. 2,092,449-50. Otto Fuchs, Frankfort-am-Main, and Wilhelm Querfurth, Mainz-Mombach, Germany.

Purification alpha-hydroxy-aliphatic acids. No. 2,092,494. Shailer L. Bass to Dow Chemical Co., both of Midland, Mich.

Apparatus for liquid level control. No. 2,092,623. Otto Kuster, The Hague, Netherlands, to The Dorr Co., Inc., New York City.

Purification sulfur from oil and similar carbonaceous material. No. 2,092,625. Raymond Clyde Rich, Houston, Tex., to Shell Development Co., San Francisco, Calif.

Carbon brush, provided with layer of copper sulfide. No. 2,092,627. Roy L. Adams, Schenectady, N. Y., to General Electric Co., corp. of New York.

Apparatus for determining viscosity of a substance. No. 2,092,632. Alda V. Bedford, Collingswood, N. J., to General Electric Co., corp. of New York.

Preparation an acid amide by interaction of ammonia with an alkyl acylate of a lower fatty acid. No. 2,092,723. John L. Brill and Richard W. Plummer, Newark, Del., to du Pont, Wilmington, Del.

Leather

Chrome tanning process; treating hides with chromium salt of a non-tanning polybasic aromatic carboxylic acid. No. 2,091,683. Eugen Immendoerfer, Ludwigshafen-am-Rhine, Germany, to I. G., Frankfort-am-Main, Germany.

Artificial tanning substances; introducing methyl sulfonic acid groups into condensation products of hydroxy aryl compounds with solid products containing a substance of the group of cellulose, lignin and humin. No. 2,092,622. Ernst Koch and Christoph Thomsen, Frankfort-am-Main-Hochst, Germany, to I. G., Frankfort-am-Main, Germany.

Metals, Alloys, Ores

Lead base alloy highly resistant to acid corrosion and having high creep resistance, composed of fully refined lead containing copper and bismuth. No. 2,089,939. Jesse O. Betterton, Metuchen, and Albert J. Phillips, Plainfield, N. J., to American Smelting & Refining Co., New York City.

Cyanide-cadmium plating composition containing an oxidized amketaldoresin. No. 2,090,049. Richard O. Hull, Lakewood, O., to du Pont, Wilmington, Del.

Glass resisting metal vapors, containing boric oxide, alumina; taken together tetravalent oxides, antimony oxide, arsenic oxide, lead oxide, and alkali oxides; bivalent oxides, and zinc oxide. No. 2,090,098. Edwin Berger and Wolfgang Harries to Jenaer Glaswerk Schott & Gen., all of Jena, Germany.

Corrosion resistant chromium-nickel-iron alloy. No. 2,090,105. Carl Carius, Essen-Rellinghausen, Germany, to Fried. Krupp Aktiengesellschaft, Essen-am-Rhur, Germany.

Method and apparatus for roasting ore. No. 2,090,386. Robert B. Ferguson, Plainfield, N. J., to General Chemical Co., New York City.

Recovery copper and cobalt from ore composed mostly of iron sulfide. No. 2,090,388. Wm. Hardiek, Balto., Md., to Davison Chemical Corp., corp. of Md.

Method protecting working surface of an iron mold; first covering surface with aluminum, protecting aluminum surface with temporary coating. No. 2,090,408. Howard C. Vance, Detroit, Mich., to Eaton-Erb Foundry Co., Vassar, Mich.

Concentration non-metallic minerals containing free silica; treating particles with an acid containing a fluorine radical. No. 2,090,418. Fred R. Johnson, Buffalo, N. Y.

Manufacure aluminum. No. 2,090,451. Osias Kruh, Vienna, Austria.

Production aluminum alloy consisting of magnesium, zinc, copper, nickel, iron, silicon and aluminum. No. 2,090,894. Yonosuke Matuenaga, Naka-ku, Yokohama, Japan.

Aluminum alloy consisting of magnesium, zinc, nickel, iron, silicon, and aluminum. No. 2,090,895. Yonosuke Matuenaga, Naka-ku, Yokohama, Japan.

Alloy comprising manganese, molybdenum, tungsten, and Monel metal. No. 2,090,946. Jacob Kurtz, Teaneck, and Clemens A. Laise, Tenafly, N. J., to Eisler Electric Corp., Union City, N. J.

Tool alloy consisting of tungsten mono-carbide, di-molybdenum carbide and an auxiliary metal. No. 2,091,017. Paul Schwarzkopf, Reutte, Tyrol, Austria, to American Cutting Alloys, Inc., New York City.

Production pure beryllium. No. 2,091,087. Bernhard Wempe, Berlin, Germany.

Manufacture tetra ethyl lead by reaction upon lead-sodium alloy with ethyl chloride. No. 2,091,112. Marion G. Amick and Joseph L. Stecker, Wilmington, Del., Alfred E. Parmelee, Carneys Point, N. J., to du Pont, Wilmington, Del.

Manufacture alkylated lead by reaction upon a lead-alkali metal alloy with an alkyl halide. No. 2,091,114. Herbert W. Daudt to du Pont, both of Wilmington, Del.

Apparatus for degreasing metal and like non-absorbent articles by means of volatile solvents. No. 2,091,182. Joseph Arthur Musgrave Woodcock Mitchell, Runcorn, England, to Imperial Chemical Industries, Ltd., corp. of Great Britain.

Degreasing apparatus. No. 2,091,187. Joseph Savage, Runcorn, England, to Imperial Chemical Industries, Ltd., corp. of Great Britain.

Welded article of high copper alloy, consisting of copper, manganese, and zinc. No. 2,091,304. Homer W. Butterbaugh, Kenosha, Wis., to American Brass Co., Waterbury, Conn.

Fabricated structure, using alloy consisting of copper, manganese, and zinc. No. 2,091,305. Homer W. Butterbaugh, Kenosha, Wis., to American Brass Co., Waterbury, Conn.

Method chromium plating. No. 2,091,386. Eugene D. Viers to Eaton Detroit Metal Co., both of Cleveland, O.

Production coated aluminum alloy consisting of aluminum, chromium, and molybdenum. No. 2,091,419. Henry F. Schroeder, Milwaukee, Wis.

Process for melting, refining, and casting of magnesium and its alloys. No. 2,091,639. Alfred Claude Jessup, Clamart, France, to Societe de Produits Chemiques des Terres Rares, Paris, France.

Temperature control in production of lead sodium alloy. No. 2,091,801. Marion G. Amick, Boothwyn and James C. Lawrence, Moylan, Pa., and Joseph L. Stecher, Wilmington, Del., to du Pont, Wilmington, Del.

Production alloys containing boron. No. 2,091,950. Jean Lucien Andrieux, Grenoble, France, to Societe d'Electrochimie, d'Electrometallurgie et es Acieries Electriques d'Ugine, Paris, France.

Aluminum base alloy consisting of aluminum, the intermetallic compound Mg_2Si, copper, chromium, and zinc. No. 2,092,012. Jos. A. Nock, Jr., Tarentum, and Geo. F. Sager, New Kensington, Pa., to Aluminum Co. of America, Pittsburgh, Pa.

Thermal treatment aluminous metals. Nos. 2,092,033-4-5. Philip T. Stroup, New Kensington, Pa., to Aluminum Co. of America, Pittsburgh, Pa.

Raw untreated water; same quantity alum added to both jars. *Left*, silicate treated. *Right*, without silicate. Photographed five minutes after stirring of chemicals ceased.

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Anodic cleaning process, using oxidizing electrolyte of nitric acid. No. 2,092,130. Ernest H. Lyons, Jr., to Meaker Co., both of Chicago, Ill.

Treatment titanium bearing ores. No. 2,092,132. Reginald Hill Monk and Archibald Stewart Ross, Montreal, Que., Canada, to American Zinc, Lead & Smelting Co., St. Louis, Mo.

Apparatus and method of spraying molten metal. No. 2,092,150. Purling A. Bleakley to Gillord Corp., both of Toledo, O.

Composition adapted to construction internal-combustion pistons; consisting of carbon, manganese, sulfur, silicon, copper, phosphorus, and iron. No. 2,092,283. Russell H. McCarroll to Ford Motor Co., both of Dearborn, Mich.

Process separating lead and sulfur from metalliferous materials containing lead sulfide. No. 2,092,451. Allan Robert Gibson, Redland, Bristol, and Stanley Robson, Shirehampton, Bristol, England, to National Smelting Co., Ltd., London, England.

Production alloy consisting of cobalt, chromium, tungsten, iron, carbon, and copper. No. 2,092,592. George R. Couls, Detroit, Mich.

Recovery beryllium from siliceous ores. No. 2,092,621. Bengt R. F. Kjellgren and Chas. B. Sawyer to Brush Beryllium Co., all of Cleveland, Ohio.

Electrical conductor having copper oxide coating and outer coating consisting of a fused mixture of sodium perborate and barium carbonate. No. 2,092,636. Jacob R. Brossman, Yeadon, Pa., to General Electric Co., corp. of New York.

Paper and Pulp

Process coloring paper. No. 2,089,949. Pierre Drewsen to Hinde & Dauch Paper Co., both of Sandusky, O.

Smooth, bright book paper sheet having good ink receptivity, formed from fibrous stock containing calcium sulfite as filler, and having surface size consisting of one or more of the class of starch, glue and casein. No. 2,090,002. Gerald Haywood, Westernport, Md., to West Virginia Pulp & Paper Co., New York City.

Apparatus for testing amount of fibres contained in waste water of pulp mills. No. 2,090,077. Carl Busch Thorne, Hawkesbury, Ont., Canada.

Apparatus for applying coating to paper. No. 2,091,572. Jos. H. Swan, 3rd, to Gardner-Richardson Co., both of Middletown, O.

Apparatus and method for making paper. No. 2,091,805. Harry A. Chuse, Madison, Wis.

Petroleum Chemicals

Separation a hydrocarbon oil-wax mixture into fractions richer in oil and wax constituents. No. 2,089,984. Geo. W. Ritter to Atlantic Refining Co., both of Philadelphia, Pa.

Manufacture motor fuel from cracked hydrocarbon vapors. No. 2,090,007. Kenneth G. MacKenzie, Westport, Conn., to Texas Co., New York City.

Purification cracked hydrocarbons. No. 2,090,159. Harris A. Smith, Port Arthur, Tex., to Texas Co., New York City.

Method sweetening petroleum distillates. No. 2,090,190. Clinton E. Dolbear, Los Angeles, Calif., to Philip Wiseman, P. Kenneth Wiseman, and Clinton E. Dolbear, trustees.

Method decomposing heavy hydrocarbon oils. No. 2,090,245. Robert E. Wilson, Chicago, Ill., to Standard Oil Co., Whiting, Ind.

Combined pyrolysis of hydrocarbon gases and for reforming of naphtha. No. 2,090,272. Chas. C. Towne, Poughkeepsie, N. Y., to Texas Co., New York City.

Production hydrocarbon lubricating oil from polymers. No. 2,090,333. Rudolph C. Osterstrom, Kenilworth, Ill., to Pure Oil Co., Chicago, Ill.

Production stabilized hydrocarbons. No. 2,090,484. Iwan I. Ostromislensky, New York City.

Process converting hydrocarbon oils. No. 2,090,504. Hermann C. Schutt and John W. Throckmorton, to Alco Products, Inc., all of New York City.

Prevention infiltration in wells, using aqueous treating solution inert to oil, comprising a soluble silicate and a water-soluble soap. No. 2,090,626. John J. Grebe to Dow Chemical Co., both of Midland, Mich.

Device for filling tanks with hydrocarbons. No. 2,090,734. Emile Piquerez, St. Cloud, France.

Continuous process treating hydrocarbons in the vapor phase. No. 2,090,766. Ernest Wayne Rembert, Plainfield, N. J., to Tide Water Associated Oil Co., New York City.

Fluorinated solvents from hydrocarbons and chlorinated hydrocarbons. No. 2,090,772. Peter J. Wiezevich, Elizabeth, N. J., to Standard Oil Development Co.

Method cracking hydrocarbon oils. No. 2,090,840. Edw. W. Isom, Scarsdale, N. Y., and Chas. L. Parmelee, deceased, late of Orange, N. J., by John W. Danforth, East Orange, N. J., and Roger C. Townsend, Troy, N. Y., executors.

Conversion hydrocarbon oils. No. 2,090,859. John B. Barnes to Universal Oil Products Co., both of Chicago, Ill.

Conversion hydrocarbon oils. No. 2,090,878. Kenneth Swartwood to Universal Oil Products Co., both of Chicago, Ill.

Polymerization of olefins. No. 2,090,905. Donald R. Stevens, Swissvale, and William A. Gruse, Wilkinsburg, Pa., to Gulf Research & Development Co., Pittsburgh, Pa.

Apparatus for controlling treatment of hydrocarbon oils. No. 2,090,915. Ross C. Powell, Forest Hills, and Leslie E. Priester, New York City, to Texas Co., New York City.

Production metal naphthenates from oil-refinery caustic waste liquors containing alkali metal naphthenates. No. 2,091,020. Vladimir L. Shipp to Socony-Vacuum Oil Co., Inc., both of New York City.

Extraction process. No. 2,091,078. Ronald S. McKittrick, Oakland, and Malcolm L. Berry, Berkeley, Calif., to Shell Development Co., San Francisco, Calif.

Method cracking higher boiling petroleum oils to produce gasoline. No. 2,091,118. Eugene C. Herthel, Flossmoor, Ill., and Carlton L. Schmidt, Hammond, Ind., to Sinclair Refining Co., New York City.

Oil treating apparatus. No. 2,091,151. Chas. Lowery, twenty per cent. to Chas. Ray Woodcock, both of Oklahoma City, Okla.

Conversion hydrocarbon oils. No. 2,091,196. Carbon P. Dubbs, Wilmette, Ill., to Universal Oil Products Co., Chicago, Ill.

Treatment naphtha distillates. No. 2,091,239. Frank W. Hall to Texas Co., both of New York City.

Hydrocarbon oil conversion. No. 2,091,261. Joseph G. Alther to Universal Oil Products Co., both of Chicago, Ill.

Apparatus for frictional distillation. No. 2,091,349. Donald J. Bergman to Universal Oil Products Co., both of Chicago, Ill.

Treatment hydrocarbons. No. 2,091,354. Gustav Egloff to Universal Oil Products Co., both of Chicago, Ill.

Pyrolytic conversion of hydrocarbons. No. 2,091,375. Robert Pyzel to Universal Oil Products Co., both of Chicago, Ill.

Pyrolytic conversion hydrocarbon oils. No. 2,091,381. Kenneth Swartwood to Universal Oil Products Co., both of Chicago, Ill.

Production synthetic lubricating oil wherein an olefin hydrocarbon is subjected to polymerizing action of a catalytic quantity of aluminum chloride. No. 2,091,398. Frederick W. Sullivan, Jr., and Vanderveer Voorhees, Hammond, Ind., to Standard Oil Co., Chicago, Ill.

Production wax-free synthetic hydrocarbon lubricating oil derived from paraffin wax by converting wax into normally liquid polymerizable compounds, thereafter treating with a polymerizing catalyst. No. 2,091,399. Frederick W. Sullivan, Jr., and Vanderveer Voorhees, Hammond, Ind., to Standard Oil Co., Chicago, Ill.

Removal naphthenic compounds and unsaturated compounds from a mixed base lubricating oil. No. 2,091,400. Frederick W. Sullivan, Jr., Wm. H. Bahlke, and Arthur B. Brown, Hammond, Ind., and Fred F. Diwoky, Chicago, Ill., to Standard Oil Co., Chicago, Ill.

Conversion hydrocarbon oil. No. 2,091,437. Alvin Engelstein to Universal Oil Products Co., both of Chicago, Ill.

Refining petroleum oil containing paraffin wax, using sulfuric acid in process. No. 2,091,624. John C. Black, Beverly Hills, and Marvin L. Chappell, Watson, Calif., to Union Oil Co. of Calif., Los Angeles, Calif.

Oil of improved viscosity-temperature coefficient, comprising lubricating oil of low viscosity index to which has been added an oil-soluble, viscous, heat polymerization product of an ester of alpha-methacrylic acid and a monohydric saturated alcohol. No. 2,091,627. Herman A. Bruson, Germantown, Phila., Pa., to Rohm & Haas Co., Phila., Pa.

Dewaxing mineral oil. No. 2,091,640. Leo D. Jones to Sharples Specialty Co., both of Phila., Pa.

Apparatus for extracting petroleum, etc. No. 2,091,645. Elliott B. McConnell, Cleveland Heights, O., to Standard Oil Co. (Ohio), Cleveland, O.

Destructive hydrogenation of a hydrocarbon product, using as catalyst a hydrocarbon oil soluble molybdenum salt of a naphthenic acid. No. 2,091,831. Emmerich v. Pongratz, Oppau, and Adam Immel, Mannheim, Germany, to I. G., Frankfort-am-Main, Germany.

Treatment oils in presence of clay. No. 2,091,892. Reginald K. Stratford, Sarnia, Ont., to Standard Oil Development Co., corp. of Del.

Apparatus for treating mineral oils. No. 2,091,917. Merrell R. Fenske and Wilbert B. McCluer, State College, Pa., to Penn Petroleum Research Corp., corp. of Pa.

Production a concentrated SO_2 gas from the acid sludge from the sulfuric acid purification of hydrocarbonaceous material. No. 2,091,937. James M. Rumple, St. Louis, Mo., to Chemical Construction Corp., New York City.

Production SO_2 gas free from hydrocarbons from thermal decomposition of acid sludge obtained in the sulfuric acid purification of carbonaceous materials. No. 2,091,943. Peter S. Gilchrist, Charlotte, N. C., and James M. Rumple, St. Louis, Mo., to Chemical Construction Corp., New York City.

Apparatus for testing oil wells. No. 2,092,062. Erle P. Halliburton, Los Angeles, Calif., to Halliburton Oil Well Cementing Co., Duncan, Okla.

Conversion olefines into alcohols. No. 2,092,164. Walter Philip Joshua, London, Herbert Muggleton Stanley, Great Bookham, Surrey, and John Blair Dymock, Sutton, Surrey, England, to Air Reduction Co., Inc., New York City.

Solvent fractionation of a petroleum oil, contacting oil with at least one phenolic substance and liquid ammonia. No. 2,092,199. Maurice H. Arveson, Hammond, Ind., to Standard Oil Co., Chicago, Ill.

Treatment acid sludge products. No. 2,092,200. Wm. H. Bahlke, Hammond, Ind., to Standard Oil Co., Chicago, Ill.

Apparatus for re-refining used oil. No. 2,092,436. John H. Vistal, New Orleans, La.

Method and apparatus for electrical demulsification. No. 2,092,491. Gale L. Adams, Los Angeles, and Roy G. Barlow, Rivera, Calif., to Socony-Vacuum Oil Co., Inc., New York City.

Method of and apparatus for distilling petroleum mixtures. No. 2,092,528. George B. Coubrough, Long Beach, Calif., to Lummus Co., corp. of Del.

Extraction process; treatment hydrocarbon oil containing asphaltic constituents. No. 2,092,739. Willem J. D. van Dijck, The Hague, Netherlands, to Shell Development Co., San Francisco, Calif.

Pigments, Dry Colors and Fillers

Preparation pigments. No. 2,090,476. Peter Fireman, Lambertville, N. J., to Magnetic Pigment Co., New York City.

Manufacture non-reactive lithopone; treating aqueous slurry of calcined lithopone containing zinc oxide with carbon dioxide. No. 2,090,642. John P. Ruth and Howard M. Boyd, Collinsville, Ill., to Glidden Co., Cleveland, O.

Preparation pigment colors; reacting aqueous suspension of a leuco salt of a vat color of the anthraquinone series with an oxidizing agent. No. 2,091,102. Ferdinand W. Peck, Penns Grove, N. J., to du Pont, Wilmington, Del.

Manufacture white lead pigment. No. 2,091,797. Royal L. Sessions, Los Angeles, Calif., to Hughes-Mitchell Processes, Inc., Denver, Colo.

Production pigment containing titanium dioxide; calcining a titanium precipitate containing acid in admixture to fluortitanic acid. No. 2,091,955. Benj. Wilson Allan to American Zirconium Corp., both of Balto., Md.

Resins, Plastics, etc.

Machine for extruding plastic material. No. 2,090,404. Frederic A. Parkhurst, Bethesda, Md., to Fiberloid Corp., Indian Orchard, Mass.

Screw press for working plastic masses. No. 2,090,434. Emil Thalmann, Niederuzwil, Switzerland, to Gebruder Buhler, Uzwil, Switzerland.

Manufacture transparent molded article from casein and urea-formaldehyde-condensation products. No. 2,090,452. Max Landecker, Wuppertal-Barmen, Germany, to Pfenning-Schumacher-Werke G.m.b.H., Wuppertal-Barmen, Germany.

Manufacture resinous compositions which harden when heated to a predetermined temperature. No. 2,090,489. Arthur Sommerfeld, Paris, France.

Method of and apparatus for making extruded products. No. 2,091,124. Burns A. Stewart, Nutley, N. J., to Patent & Licensing Corp., New York City.

Apparatus for extruding plastic material. No. 2,091,125. Burns A. Stewart, Nutley, N. J., to Patent & Licensing Corp., Boston, Mass.

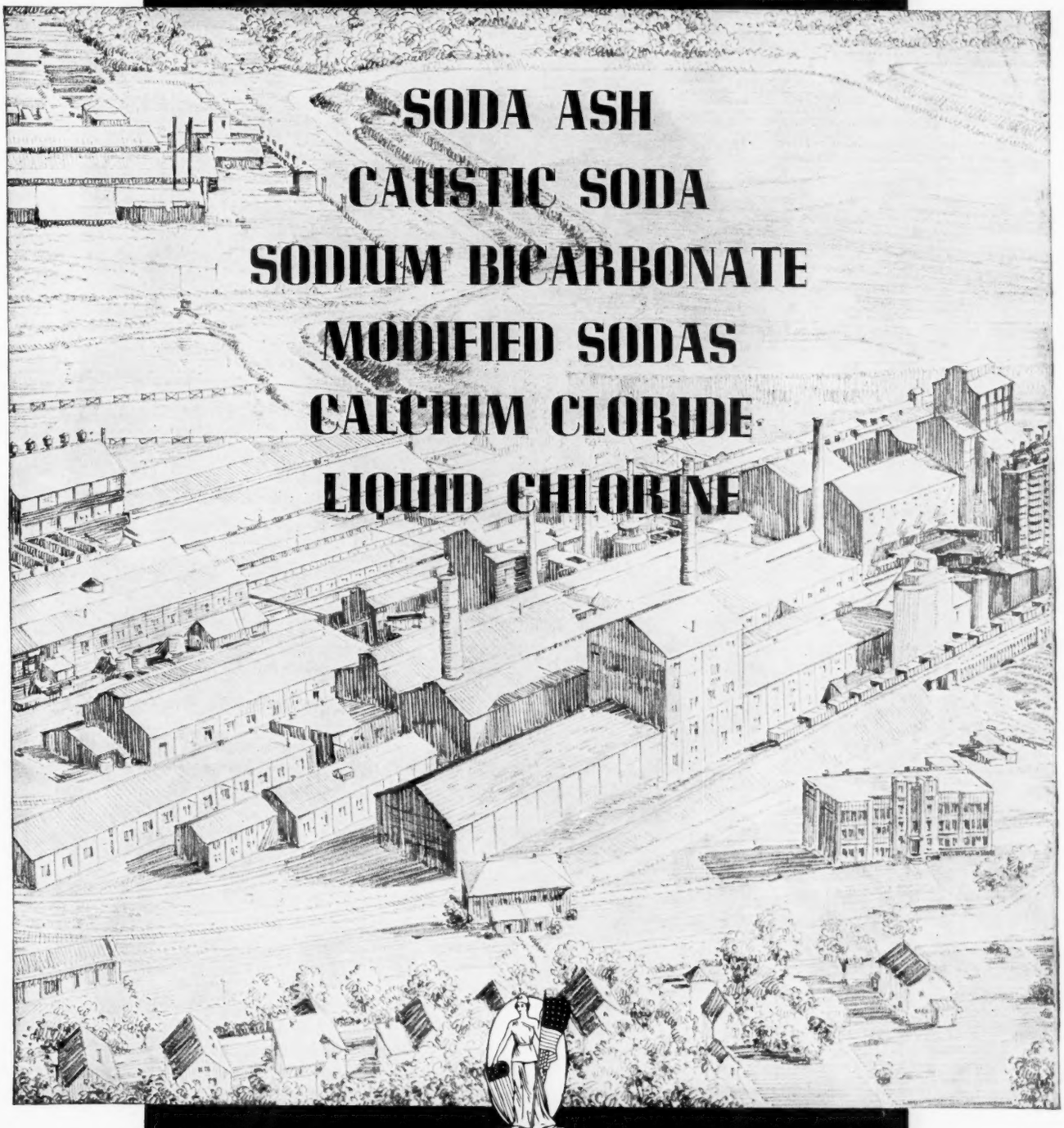
Preparation molded products from phenolic condensation products and tung oil. No. 2,091,164. Fritz Seebach, Erkner, near Berlin, Germany, to Bakelite Corp., New York City.

Production water soluble phenol aldehyde addition products. No. 2,091,183. John A. Murray and Arthur M. Howald, Toledo, O., to Plaskon, Inc., corp. of Del.

Manufacture marbleized composition material. No. 2,091,361. George P. Heppes to Tile-Tex Co., both of Chicago Heights, Ill.

Condensation products of formaldehyde with hydrolized polymerized vinyl acetate, same being mixed with mixture of dimethyl phthalate and another ester of phthalic acid. No. 2,092,056. Gustavus J. Esselen, Swampscott, Mass., to Fiberloid Corp., Indian Orchard, Mass.

COLUMBIA



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Production synthetic resins and resinous materials from unsaturated hydrocarbons. No. 2,092,295. Adrianus Johannes van Peski and Johan Ferdinand Maurits Caudri, Amsterdam, Netherlands, to Shell Development Co., San Francisco, Calif.

Synthetic product; toluol-soluble product of the resin-gum-balsam group, comprising reaction products of a glyceride oil, glycol and glycerol and a crystalline organic acid of a resinifying character. No. 2,092,713. Carleton Ellis to Ellis-Foster Co., both of Montclair, N. J.

Synthetic resin; reaction product of a polyhydric alcohol, a pinene-maleic anhydride and an organic carboxylic acid. No. 2,092,741. Irvin W. Humphrey to Hercules Powder Co., both of Wilmington, Del.

Rubber

Vulcanization rubber, using basic nitrogen-forming accelerator. No. 2,090,242. Jan Teppema, Wayne, N. J., to Wingfoot Corp., Wilmington, Del.

Apparatus for vulcanizing rubber. No. 2,090,570. Austin Horace Claessen, Kuala Lumpur, Selangor, Federated Malay States.

Rubber composition comprising aqueous dispersion of rubber and a waxy non-aqueous liquefiable vehicle containing a vulcanizer. No. 2,090,629. Glen S. Hiers and John E. Conrad, Bala-Cynwyd, Pa., to Collins & Aikman Corp., Phila., Pa.

Vulcanizing rubber by incorporating in a rubber mix an alkaline earth salt of a 1-mercapto arylene thiazole. No. 2,091,345. Ira Williams, Woodstown, N. J., to du Pont, Wilmington, Del.

Method controlling liquid absorbing property of coagulated latex. No. 2,091,364. Ernest J. Ross, Cranston, R. I., to U. S. Rubber Products, Inc., New York City.

Formation artificial dispersions rubber, gutta-percha, etc., of predetermined stability. No. 2,091,559. Edward Arthur Murphy and Evelyn William Madge, Wylde Green, Birmingham, England, to Dunlop Rubber Co., Ltd., London, England.

Production vulcanized rubber products; incorporating in rubber a vulcanizing agent and an N-dialkyl-carbamyl dialkylthiocarbamyl sulfide. No. 2,091,712. Percy J. Leaper, Naugatuck, Conn., to U. S. Rubber Products, Inc., New York City.

Method stabilizing a chlorine-containing rubber compound. No. 2,091,878. John M. Peterson, Kennett Square, Pa., to Hercules Powder Co., Wilmington, Del.

Apparatus for plasticizing rubber stock. No. 2,092,720. Wm. R. Urquhart, Akron, O., to Wingfoot Corp., Wilmington, Del.

Textile, Rayon

Production threads having a crepe twist from textile threads. Nos. 2,089,947-8. Wm. Alexander Dickie and Robert Wighton Moncrieff, Spondon, near Derby, England, to Celanese Corp. of America, corp. of Del.

Process of and apparatus for treating fine filamentous threads. No. 2,089,962. Chas. A. Huttinger, Lakewood, O., to Acme Rayon Corp., Cleveland, O.

Apparatus for spinning rayon, etc. No. 2,090,064. Oskar Oppenlaender, Rome, Ga., to Tubize Chatillon Corp., New York City.

After-treatment freshly extruded spool-spun viscose filaments; using liquid with an osmotis pressure isotonic with that of filaments. No. 2,090,339. John L. Bitter, Elizabethton, Tenn., to No. American Rayon Corp., corp. of Del.

Process drying artificial filaments. No. 2,090,352. Conrad Herrmann, Wuppertal-Elberfeld, Germany, to North American Rayon Corp., corp. of Del.

Manufacture staple fiber; extruding cellulose solution containing sharp edged substances from group of infusorial earth, ground glass, carborundum, brick and porcelain, so as to produce protuberances and lumps on surface of fibers. No. 2,090,560. Leo Ubbelohde, Berlin-Charlottenburg, Germany.

Device for crimping filaments. No. 2,090,669. Camille Dreyfus, New York City, to Celanese Corp. of America, corp. of Del.

Manufacture and treatment artificial materials. No. 2,090,670. Henry Dreyfus, London, England.

Textile machinery. No. 2,090,682. Edward Kinsella and Wm. Ivan Taylor, Spondon, near Derby, England, to Celanese Corp. of America, corp. of Del.

Etherifying cellulose fibers with ethylene oxide to form hydroxy ethyl ether of cellulose, using alkaline aqueous solution in process. No. 2,090,808. Geo. A. Richter to Brown Co., both of Berlin, N. H.

Manufacture and after treatment of artificial filaments, yarns, etc. No. 2,090,862. Rudolf Etzkorn, Oberbruch, Germany, to North American Rayon Corp., New York City.

Production fibrous materials from animal skins. No. 2,090,902. Roland Runkel and Gustav Lange, Weinheim, Germany, to Carl Freudenberg, G. m. b. H., Weinheim (Badenia), Germany.

Production artificial filaments, etc., characterized by being delusterable by water at 40° C., using solution containing organic derivative of cellulose, a solvent, and Turkey red oil. No. 2,090,924. Wm. Whitehead, Cumberland, Md., to Celanese Corp. of America, corp. of Del.

Production textile assistants; reacting with an alkylene oxide upon a long-chain aliphatic nitrogenous organic compound. No. 2,091,105. Henry Alfred Piggott, Cheadle Hulme, England, to Imperial Chemical Industries, Ltd., corp. of Great Britain.

Production textile assistants; compounds of the dimethylolureaethyleneoxide condensation products series. No. 2,091,106. Henry Alfred Piggott, Cheadle Hulme, England, to Imperial Chemical Industries, Ltd., corp. of Great Britain.

Treatment fine filamentous threads. No. 2,091,282. Chas. A. Huttinger, Lakewood, O., to Acme Rayon Corp., Cleveland, O.

Production creped fabrics having strand components of the acetylated cellulose class. No. 2,091,454. Edmond H. Reynier, Passaic, N. J.

Process finishing textiles containing artificial silk and cellulosic fibers to render them crush-resistant, using aqueous bath containing the soluble salts of boric and salicylic acids. No. 2,091,567. Alfred Pierre Honoré Pouteaux, Ethirey, France, to J. B. Martin Co., Norwich, Conn.

Apparatus for production artificial thread having an uneven denier. No. 2,091,612. Rene Picard, Vaulx en Velin, France, to du Pont, Wilmington, Del.

Apparatus for treating tubular cakes of artificial yarn as spun. No. 2,091,725. Alexander C. White, So. Dartmouth, and John R. Leatham, New Bedford, Mass., to New Bedford Rayon Co., New Bedford, Mass.

Manufacture or treatment artificial materials of improved extensibility and unimpaired tenacity; subjecting them to saponification by means of liquid media containing lower aliphatic monoamines. No. 2,091,967. Henry Dreyfus, London, England.

Production improved artificial products of high tenacity and extensibility; subjecting same to saponification by treatment with a nitrogenous organic base in liquid phase. No. 2,091,969. Henry Dreyfus, London, England.

Manufacture artificial materials of improved extensibility and unimpaired tenacity, using aqueous bath containing an organic base and swelling agent. No. 2,091,970. Henry Dreyfus, London, England.

Manufacture and treatment artificial materials. No. 2,092,004. Robert Wighton Moncrieff, Frank Brentnall Hill, and Thos. Barnard Frearson, Spondon, near Derby, England, to Celanese Corp. of America, corp. of Del.

Manufacture and treatment artificial materials. No. 2,092,005. Robert Wighton Moncrieff and Frank Brentnall Hill, Spondon, near Derby, England, to Celanese Corp. of America, corp. of Del.

Treatment or manufacture cellulose ester materials; using swelling bath containing a non-aromatic nitrogenous organic base which contains less than 7 carbon atoms. No. 2,092,007. Robert Wighton Moncrieff and Frank Brentnall Hill, Spondon, near Derby, England, to Celanese Corp. of America, corp. of Del.

Saponification of cellulose ester materials. No. 2,092,008. Robert Wighton Moncrieff, Frank Brentnall Hill, and Thos. Barnard Frearson, Spondon, near Derby, England, to Celanese Corp. of America, corp. of Del.

Saponification of materials consisting of or containing organic esters of cellulose. No. 2,092,009. Robert Wighton Moncrieff, Frank Brentnall Hill, and Thomas Barnard Frearson, Spondon, near Derby, England, to Celanese Corp. of America.

Manufacture artificial materials having a cellulose acetate base; softening materials with a medium containing a lower aliphatic amine. No. 2,092,055. Henry Dreyfus, London, England.

Apparatus for treating artificial fibers. Nos. 2,092,124-5-6. Jos. Paul Laird, Phila., Pa., and Frederick C. Niederhauser, New York City, to Wicaco Machine Corp., Phila., Pa.

Web of creped fabric having a high resident stretchability, coated on one side with a thermoplastic adhesive and a layer of rubbery substance. No. 2,092,140. Wm. Wallace Rowe, Cincinnati, O., to Paper Service Co., Lockland, O.

Desulfurizing and after-treating viscose silk, treating sulfur-containing artificial material from viscose with a liquid dispersion of an alkylated aromatic sulfonic acid. No. 2,092,203. Walter Brennecke, Wolfen Kreis Bitterfeld, Karl Brodersen, Dessau, and Emil Hubert, Dessau-Ziebigk, Germany, to I. G., Frankfort-am-Main, Germany.

Apparatus for testing yarns, threads, filaments, etc. No. 2,092,439. Aleidus G. Bouhuys to American Enka Corp., both of Enka, N. C.

Production threads, bands, tubes, etc., consisting of mixture of cellulose and polyvinyl alcohol, in combination with a material which promotes the reabsorbability thereof. No. 2,092,512. Willy O. Herrmann, Munich, Fritz Hammer, Bezirk Kassel, Hessen, and Wolfram Haehnel, Munich, Germany, to Chemische Forschungsgesellschaft, m. b. H., Munich, Germany.

Saponification filaments, threads, etc., having basis of organic ester of cellulose, by treatment with liquid medium containing an alkaline salt of an organic acid with a water-soluble nitrogenous base. No. 2,092,696. Henry Dreyfus, London, England.

Water, Sewage Treatment

Apparatus for sewage digestion. No. 2,090,194. Anthony J. Fischer, Jackson Heights, and Nels B. Lund, Seaford, N. Y., to Dorr Co., Inc., New York City.

Sewage treatment apparatus. No. 2,090,384. Augustus C. Durdin, 3rd, Niles Center, Ill., to Chicago Pump Co., Chicago, Ill.

Hydraulic sewage disintegrator. No. 2,090,637. Samuel B. Paige, Baker, Ore., one-fifth to Lawrence R. Martin, one-fifth to Walter L. Scott, and one-fifth to Forrest L. Hubbard, all of Baker, Ore.

Water softening device. No. 2,091,002. Geo. A. Lewis, Chicago, Ill., to Permutit Co., New York City.

Purification and softening water by treatment with products of strong alkaline character and metal salts. No. 2,091,201. Fritz Hahn, Cologne-Mulheim, Germany.

Apparatus for sewage digestion. No. 2,091,631. Anthony J. Fischer, Jackson Heights, and Nels B. Lund, Seaford, N. Y., to Dorr Co., Inc., New York City.

Water conditioning apparatus. No. 2,092,716. Churchill Hungerford, Wenonah, and Bruce Dickerson, Glassboro, N. J., to Hungerford and Terry, Inc., Clayton, N. J.

Anti-Shrink Wool Treatment

Treatment of wool with an inert liquid containing a limited quantity of sulfuryl chloride reduces its tendency to felt or shrink. Method disclosed in E. P. 464,503 (1935), states the sulfuryl chloride may be used in the gaseous state or dissolved or dispersed in an inert volatile organic solvent, and preferably of not more than two per cent. strength by volume. The wool may be in package form, as cops, as skeins or fabric, and may be moist when treated. In examples: (1) Air dried scoured knitted wool fabric is steeped for 1 hour at 18° C. in a solution of 0.2 gals. sulfuryl chloride in 10 gals. white spirit. The fabric is hydro-extracted until three per cent. only of the solution remains therein, washed, neutralized in dilute aqueous ammonia, washed and dried; (2) wool skeins are suspended in a chamber, air withdrawn, and sulfuryl chloride vapor admitted; (3) wool yarn wound as cops on paper tubes is steeped for 1¼ hours at 18° C. in a solution of 0.2 gallons of sulfuryl chloride in 10 gals. white spirit, hydro-extracted and dried. The process can be worked in conjunction with carbonizing, by steeping in the sulfuryl chloride solution, hydro-extracting, and heating for half-hour at 85—90° C., whereby burrs are disintegrated and can be removed.

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Synopsis of New Rubber Specialties

THE following data, abstracted from the *Annual Survey of American Rubber Chemistry for 1936*, by Webster N. Jones, presents the most pertinent subjects in this highly informative review.

Retarders of Vulcanization

Thies[28] used alphapolyoxymethylene as a retarder of vulcanization. He used a small amount of an acid having the formula $(CH)_2(COOH)_2$ to avoid scorching of rubber.[29]

Sibley[30] to retard the vulcanization of rubber, used compounds of the general formula:

$$R'O—C_6H_4—COOR$$

where R represents hydrogen, a metal, or a salt, or an aromatic ester forming radical, and R′ represents hydrogen or an acyl radical.

Williams[31] inhibited the vulcanization of rubber below 110°C. with substituted benzoic acid compounds selected from the group compounds having the formula:

$$X—C_6H_4—COOM$$

Plasticizers

Ungar[32] softened and de-nerved crude rubber so that the softened and de-nerved condition was permanent until the rubber was vulcanized. The rubber, in a water-free condition, was exposed to air at a temperature of 330°-347°F. The rubber thereafter was cooled in air. The period exposure of the rubber at the temperature stated and the rate of subsequent cooling were so controlled as to result in an increase in weight of approximately 0.5% to 2%.

Cowdery[33] compounded rubber with coal-tar pitch, by first blending coal-tar pitch with stearic acid, thereafter mixing the resultant blend with rubber.

Fisher[34] produced a highly tacky rubber composition by treating a rubber composition devoid of vulcanization characteristics with two to five parts of aromatic nitroso compound per hundred parts of rubber.

Williams and Smith[35] used aromatic phenols to plasticize rubber and to reduce the viscosity of rubber cements.

Age Resisters

Somerville[36] studied the effect of oxygen absorbers in rubber. He described a method for retarding the tendency of vulcanized rubber to crack under flexing. It is based on the theory that such cracking is due to oxidation by free oxygen dissolved in the rubber, and involves addition of organic substances which absorb the oxygen in the presence of a base. The results obtained with pyrogallol plus ethanolamine and pyrogallol plus hydroquinone plus ethanolamine are described. The experimental results are of direct practical significance, since with oxygen absorbers, higher proportions of carbon black can be used with no greater tendency to crack by flexing. The use of oxygen absorbers also enables the use of lower proportions of sulfur.

Elley[37] discussed the protection of rubber and gasoline by anti-oxidants. The instability of rubber and gasoline necessitates the protection of these substances against oxidation. By means of oxidation-reduction potentials, it was found that the economically important anti-oxidants for these systems occur in the classes of aromatic phenols; substituted aromatic amines; aminophenols and amines condensed with aldehydes or ketones. Those products well established in commerce were listed.

Campbell and Reed[38] presented a paper on age resisters in vulcanized rubber, hydroxy-substituted N-phenylmorpholines. Six hitherto unknown N-phenylmorpholines were prepared by treatment of the particular arylamine with β, β′—dichlorodiethyl ether in the presence of water and calcium carbonate at 100° C. and with violent agitation. Tests of the protective effects against oxidation and the staining effects in comparison with phenyl β-naphthylamine in typical vulcanized rubber compounds were described. A study was also made of the influence of the Me and Ph groups on the solubility of the compounds in vulcanized rubber.

Semon and Craig[39] described the following new acridane compounds prepared by the use of Grignard reagents: 5,5-dimethylacridane, 5,5,10-trimethylacridane, 5,5-diethylacridane, o-anilinophenyldiethylcarbonal, 5,5-di-n-butyl-acridane, and the double compounds of acridane and 5-methylacridane with 5,5 dimethylacridane.

Semon[40] prepared an anti-oxidant by heating a dihydroxy-aryl substituted saturated hydrocarbon obtained by acid condensation from a phenol and a liquid aliphatic ketone, in the presence of a non-oxidizing mineral acid with a substance having the formula:

$$R—NH—R'$$

wherein R is a group selected from the class consisting of aryl groups and alkoxy-aryl groups, and R′ is a group selected from the class consisting of hydrogen, aryl groups, and alkoxy-aryl groups. He also prepared a secondary amine by the reduction of an azo compound to form a mixture of primary aromatic amines, heating the mixture of amines to cause them to condense to a secondary aromatic amine.[41]

Semon[42] also preserved rubber by the use of a substance having the general formula:

$$R_1—NH—R_2—NH—R_1$$

wherein R_1 and R_2 are benzene nuclei, at least one of which contains an alkyl substituent, but which contain no other substituents, and R_2 is a para-phenylene group. He described the process of making secondary aromatic amines by the preparation of a salt of a phenol and a primary aromatic amine, separately, then heating the salt to cause the condensation of the secondary amine.[43]

Semon[44] used as an anti-oxidant the reaction product of an aromatic amine and an acyclic intermediate amine obtained by the condensation of one molecule of a ketone with one to two molecules of an aromatic amine. He also used a diaryl p-phenylene diamine wherein the phenylene nucleus contains a hydrocarbon substituent.[45] He retarded the deterioration of rubber with compounds having the general structural formula:

where R and R_1 represent carbon rings which may contain hydrocarbon and alkoxy substituents but no others, and X represents a carbon bridge ortho to the nitrogen.[46]

Craig[47] retarded the deterioration of rubber by the use of a compound having the general structural formula:

$$R_1—NH—R_2$$

where R_1 represents an indane nucleus, and R_2 represents an aryl, hydroxyaryl, alkoxy-aryl, aryloxy-aryl, or amino-aryl group.

Sloan[48] preserved rubber by the use of a substance having the general formula:

where A and A′ represent amino groups which may contain hydrocarbon substituents, R and R′ represent aromatic nuclei, and X and Y represent hydrocarbon groups.

Epstein and Harris[49] patented the use of a derivative of an aliphatic polyhydroxy substance having at least one relatively high molecular weight alkyl or acyl group and at least one free hydroxy group attached to a carbon of the polyhydroxy substance.

Campbell[50] prepared aliphatic amines by adding an excess of anhydrous ammonia to an aliphatic halide. An inert gas was added to increase the total pressure to a value considerably above the vapor pressure of the mixture at the reaction temperature.

Clifford[51] preserved rubber with the reaction product of the amino derivative of a diphenylene oxide and an aliphatic aldehyde. He improved the age resisting properties of rubber by the use of a complex reaction product of wood creosote and a primary aromatic amine.[52]

Scott and Byers[53] preserved rubber with the condensation product of an aliphatic aldehyde with a diarylamine containing two amino groups.

Lauter[54] preserved rubber by the use of a compound from the group consisting of the mono primary aminofluorenones and the diprimary amino fluorenones. He described a method of preparing secondary aromatic amines in the presence of a dehydrating agent selected from a group consisting of alkali metal bisulfates, alkali metal pyrosulfates, and alkali metal acid phosphates.[55] He used as an anti-oxidant tertiary N-alkyl aryl naphthylamine.[56]

Cramer[57] prepared di-tetrahydro *a*-furfurylamine by treating the furfurylamine with hydrogen at high pressure and elevated temperatures in the presence of various catalysts.

Morton[58] patented as an age resister a substituted ethyl amine in which at least one of the substituents attached to each nitrogen atom is aromatic in nature, the compound containing not more than two negatively substituted hydrocarbon residues and characterized in that it contains no highly negative substituents.

Beaver[59] used as an anti-oxidant for rubber a reaction product obtainable by reacting in the presence of an acid condensation agent substantially two molecular proportions of an aliphatic aldehyde and substantially one molecular proportion of a ketone.

Martin[60] used an anti-oxidant for rubber with a reaction product obtainable by reacting in the presence of an alkaline inorganic catalyst substantially equimolecular proportions of a diarylamine, an aliphatic aldehyde, and an aromatic mono hydroxide consisting of C, H, and O atoms only.

Neal[61] preserved rubber with hydroxy phenylamine N-phenylmorpholine or indophenols.

As a preservative of rubber, Coe[62] used chlorophyll green in such a manner and amount as to exclude from the rubber all wave lengths of light except those subject to transmission through a color screen having a spectral transmission of the wave lengths lying between 5270 and 6500 Angstrom units of the spectrum.

Calcott and Douglass[63] used alkoxy-substituted diphenylamine as an anti-oxidant.

Stevens[64] prepared an anti-oxidant by treating a cracked petroleum distillate with a mixture of a phenol and sulfuric acid in proportions ranging from 2 to 6 pounds of sulfuric acid and 2 to 12 pounds of the phenol to one barrel of cracked distillate. The reaction mixture was washed with an aqueous alkali solution and then fractionally distilled.

Wolfe[65] used as an anti-oxidant a condensation product of phenol containing at least two discrete rings and an amine.

Ingram[66] preserved rubber with a reaction product of para amino diphenyl with acetone.

Compounding Ingredients and Compounding

Barron[67] discussed the reenforcement of rubber with stearic acid. Stearic acid had only a small effect on the total reenforcement, but reduced considerably internal friction and increased the retraction value. It decreased the interfacial tension between rubber and filler and increased the wetting of the filler by the rubber, *i.e.*, increased the true reenforcement. There are several known phenomena in support of this view, including particularly the acceleration of the rate of vulcanization by stearic acid and the blooming of stearic acid on a freshly cut surface of vulcanized rubber.

Amon[68] showed that heat treatment of carbon black resulted in a loss of the reenforcement properties when compounded in rubber stocks. Changes in physical structure and surface activity are caused by heating. X-ray examination indicated that there is also a distinct change in inner structure of carbon black particles.

Bixby and Hauser[69] evaluated the transparency of rubber stocks containing magnesium carbonate. Japanese carbonate of formula $5MgO{\cdot}4CO_2{\cdot}6H_2O$ gave higher light transmission at low volume loadings than the best domestic carbonate of formula $5MgO.4CO_2{\cdot}9H_2O$.

Park[70] described the use of protective colloids such as ammonium stearate, ammonium oleate, triethanolamine oleate, triethanolamine stearate, and triethanolamine palmitate, which are utilized in the treatment of paint and rubber pigments in order to make them more dispersible.

Park[71] described a new finely divided pigment prepared by the absorption of condensed vapors of pine tar oil on the surface of the particles.

Sibley[72] described the use of an aliphatic ester of abietic as a compounding ingredient.

Curtis[73] prevented the flowing of wire insulation rubber compounds during vulcanization by incorporating in rubber stocks approximately 1% by weight of magnesium oxide powder in addition to an organic type of accelerator.

Maynold and Kunz[74] used phenyl ethyl alcohol, phenyl propyl alcohol, cinnamic alcohol, anisic alcohol, methyl phenyl carbinol, geraniol, citronello, linalol, terpineol, borneol, and their esters in an amount not exceeding 1.0% on the rubber to remove objectionable odors.

Smith[75] described a method of producing sulfur of high insoluble sulfur content by burning hydrogen sulfide with a limited amount of air under water, so as to surround small volumes of the resulting sulfur vapor and inert gas with the water, thereby rapidly cooling the sulfur and causing it to separate in the form of a finely divided solid.

Cements and Adhesives

Garvey[76] investigated the effect of sulfur monochloride on the viscosity of dilute rubber cements. This effect was modified by exposure to diffused daylight, higher temperature, or mechanical agitation. Films obtained by evaporation of cements shortly after treatment with sulfur monochloride were insoluble. The film solubility was increased by allowing the cement to stand or by stirring it. Consideration of the experimental results led to a new interpretation of vulcanization in which geometric isomerization has an important part.

Williams[77] discussed the structure of rubber sols as indicated by swelling and viscosity measurements. The fractional increase in viscosity caused by dissolving rubber in different solvents bore no relation to the viscosity of the solvents, but was proportional to the swelling of rubber in the solvents. The solvent may be removed from a rubber sol and replaced by a different solvent which will produce a viscosity characteristic

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of the second solvent. This indicated an equilibrium between each solvent and the rubber. Increase in viscosity is probably caused by swelling of the miscelle and immobilization of solvent rather than by the presence of rigid filiform molecules.

Ford[78] presented an article on non-solvents in rubber cements. The results gave a basis for comparison among the more common non-solvents in cements in which the solvents used are benzene, naphtha, or ethylene dichloride. Results of variation of controlling factors, such as degree of mastication, humidity, temperature, concentration of non-volatile ingredients, and the proportion of non-solvent, were shown.

Kempel[79] used as a rubber repair material an unvulcanized rubber containing terpene oil.

Conant[80] vulcanized rubber to leather by the use of a hot viscous latex cement adapted to unite with and become an integral part of the rubber composition during vulcanization.

King and King[81] reduced the churning time in the manufacture of cements of low viscosity with a sulfonated hydrocarbon as an activator.

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Maintenance Cleaner

Houghto-Clean No. 180, a fine powder of low alkalinity, containing soap as well as a mild abrasive is the latest addition to the line of metal and maintenance cleaners produced by E. F. Houghton & Co., Phila. It is free-rinsing and non-corrosive. Having adequate properties of emulsification and saponification as well as mild abrasion, it removes the thin films of mineral or vegetable and animal oils mixed with dust which form the bulk of dirt found on the floors, walls and steps of large buildings.

Photographic Developers

The manufacture of fine grain photographic developers by combining *p*-phenylenediamine with an *o*-dihydroxybenzene, substituted or not, or a substituted *p*-dihydroxybenzene, by bringing together aqueous solutions of the components in the presence of a reducing agent of acidic character is mentioned in E. P. 466,626. In an example, *p*-phenylenediamine is dissolved in sodium bisulfite solution, treated with decolorizing charcoal, filtered hot, and mixed with a hot solution of pyrocatechin in potassium metabisulfite solution. The pyrocatechin may be replaced by pyrogallol or chloroquinol. E. P. 466,625 is referred to.

Unusual Synthetic Waxes

Two new self-emulsifying waxes of interest to manufacturers of bright-drying finishes, are being made by Beacon Co., 89 Bickford St., Boston, and sold under the names of Ceryl Wax O and Ceryl Wax Z. No elaborate equipment or compounding is necessary, and failure in producing a good emulsion is said to be virtually impossible. Some of the outstanding properties claimed for them are:

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The films may be augmented by a shellac solution or for the highest degree of waterproofness by a specially prepared synthetic liquid resin.

New Soap Ingredient

A purified form of evaporated sulfite cellulose liquor, known as Zewa powder, suitable for use in soap manufacture, especially soft soaps, soap powders and flakes, has been put on the market by a German manufacturer of mechanical and chemical wood pulp. Powder is nearly white and only takes on a yellowish-brown color when in contact with water.

Waterproofing Compounds

B. P. 416,885 (I. G.) states that suitable waterproof dressings may be made by using mixtures of tragacanth, British gum, polyvinyl alcohol or starch with the products obtained by the action of strong acids on the saponification products of the mixed polymerization products obtainable by interpolymerizing acrylic acid esters and such vinyl esters as yield saponifiable polymerization products, or by simple heat treatment when the saponification products are in the form of ammonium salts.

Fire Extinguisher Enamel

A red synthetic baking enamel which adheres readily to brass, steel, iron, tinplate and any of the metals used in the manufacture of fire extinguishers is announced by North Bergen Varnish Corp., No. Bergen, N. J. It is specifically designed to resist the effects of the carbon-tetrachloride-base fire-extinguisher liquid with which fire extinguishers are filled.

Fireproof Paints

A paint has been developed in Germany for protecting wood against fire. Composition of the product is reported to be nitrogen salts incorporated with a synthetic resin, according to Consul Sydney B. Redecker. On contact of the flame with the painted wood surface, the paint develops an insulating foam crust which effectively protects the wood against fire. Fireproof paints have been acquiring increased importance in Germany of late, especially for purposes of national defense and as protection against incendiary bombs discharged upon cities.

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Cotton Size Mixings

Their Uses and Properties

By P. L. Mann

THE principal object of sizing cotton yarn is to strengthen it by saturation with a starchy substance which binds the various fibers together, and gives a smooth and fairly even surface, greatly reducing the frictional action of the reed and heddles during the weaving of the yarn into cloth. Other objects are to impart "feel" to the cloth, and give it additional weight.

A considerable variety of substances are found in size mixings, of which the more important are included in the following:—

(1) Substances possessing adhesive or glutinous properties, to strengthen the yarn and fix other ingredients and all loosely projecting fibers firmly upon its surface. These include wheat flour, sago, farina or potato starch, rice flour or starch, maize.

(2) Substances to render the sized yarn soft, pliable and smooth. These include tallow, grease, oils, wax, glycerin, and soap.

(3) Weighting substances, mostly China clay.

(4) Substances to destroy or prevent the growth of mildew, for which purpose zinc chloride is almost exclusively used.

(5) Deliquescent substances, to attract moisture to the sized thread, whereby it may retain its pliability and prevent the powdery substances from being rubbed off. Magnesium chloride, calcium chloride and glycerin.

Adhesive substances should be examined with respect to color, odor, moisture, adulterations, amount of gluten, and consistency. The color is compared by placing samples side by side and flattening their surfaces so that they may be in contact with each other. A musty or moldy smell indicates decomposition. The amount of moisture may be ascertained by weighing a sample and drying in an oven.

Mineral adulterations are left as a residue when a sample is burned over a Bunsen flame; others reveal themselves when a paste is formed by boiling, and afterwards allowed to cool in a receptacle. It will then set into a firm mold, and on removing from the receptacle other ingredients are seen on the surface. The latter test is also used to ascertain the consistency or strength of flour. The firmness of the mold, tenacity of the paste, and length of time elapsing before it runs to water determining the value.

Quantity of gluten is ascertained by running water through a muslin bag containing a sample of the flour. After the water has ceased to leave the bag with a milky color, it is removed and the quantity and strength of the gluten left gives a good indication of the value of the flour.

Softeners should be examined with respect to color, hardness, specific gravity, odor, melting point; China clay and chalk for color and freedom from grit. Zinc and magnesium chlorides can only be satisfactorily tested by expert chemists.

The secret of preparing size lies in the boiling. Every granule of the starch used should be opened. One of the characteristic and interesting properties of starch is that of forming a viscous fluid with hot water, which on cooling produces a paste. This results from the bursting of the granules and the absorption of water by the interior portion—known as granulose. The temperature at which the rupture takes place is known as the temperature of gelatinization. It varies with the age of the granule, and the variety of starch. Young immature granules burst first. The point of complete gelatinization for certain varieties has been found to be wheat starch 176°F., rice 176°F., maize 167°F., farina 149°F. These figures were obtained with purified starch.

The more perfect the gelatinization the better the paste, but the quality of the paste varies with the variety of starch. Cassava and sago both produce thin paste, the former particularly so. Maize produces an opaque paste, and both maize and sago pastes can be boiled for a longer period by "open steam" without losing strength. On the other hand, farina rapidly loses its gelatinous character when so treated and liquefies, thereby losing its adhesive properties. The addition of small quantities of certain chemicals, *e.g.*, caustic soda five per cent., increases the viscosity and gelatinous character of the paste, and also assists in its preservation. Starch will make this paste once only—if it is destroyed, no process is yet known which is capable of restoring the property of gelatinization.

Correct automatic coördination of time and temperature in size cooking is the best means of ensuring efficient gelatinization. The same viscosity of the solution can only be maintained by constant and even temperature, thus enabling proper size penetration and aiding uniform deposition.

The composition of a size mixing is determined by the nature of the yarn, its counts, weight of cloth to be woven, *i.e.*, number of ends and picks per inch, whether the cloth is to be used in the grey state or bleached, dyed, or printed, weight to be added, feel desired and condition of the atmosphere of the weave room as regards humidity.

The various factors involved make it possible to give definite information as to proportioning size ingredients to be used, owing to the variation of their qualities and the circumstances under which they are used. So far as weaving qualities alone are concerned, and such only are necessary when the cloth is to be afterwards bleached, dyed or finished, a light size is sufficient.

For light sizing it is not necessary to use anything but wheat flour, farina, or sago, and a small quantity of softening material, usually tallow or wax. Wheat flour is fermented before using by mixing it well with water (about equal weights of each) and leaving it for several weeks, occasionally stirring to keep the particles in suspension. When flour is fermented new bodies are formed, which have a powerful influence in preventing mildew.

Softening materials are used to render the yarn more pliable. The ingredients mostly used for this purpose are tallow, wax, soap, cocoanut and palm oil. Tallows of good quality set hard and firm upon the yarn. Cocoanut and palm oils are moderately good softeners; but they melt at low temperatures, are liable to decomposition, and are dark colored; therefore they are generally used along with other softening ingredients. Paraffin waxes increase the smoothness of the sized thread, set hard upon it, and have high melting points, but do not mix well. They should not, however, be used on goods which must subsequently be bleached, as they are difficult to remove in bleaching processes, and cloth containing them comes up blotched after dyeing or printing. For these cloths spermaceti wax should be used.

The following mixtures are suitable for light sizing, and can be made to give greater or less percentage, according to the density of the mixture.

Wheat flour	91%
Tallow	9%

Another mixture is:

Sago	31%
Farina	59%
Tallow	8%
Soap	2%

SUPERCLEAR

stays clear

IT'S REFINED...
NOT BLEACHED

New Golden Clear Printing Gum Will Not Oxidize

• The clarity of Superclear is due to a special process of refining. No matter how long Superclear is exposed to the air it will not oxidize and turn dark as do ordinary printing gums which are made clear through bleaching.

For clear, sharp prints, fine impressions, deep penetration, light colors, resist printing—insist on Superclear. Avoid ordinary gums treated with bleaching agents, the residues of which may cause oxidation and affect printing quality.

Make this test—leave a sample of Superclear and a sample of any other clear printing gum exposed to the air. Superclear will *stay* clear—the other will oxidize.

Send for free sample of Superclear, and *compare* with gums you now use.

Left: Showing permanent clarity of Superclear printing gum.
Right: Showing early oxidation of bleached printing gums.

JACQUES WOLF & CO.

MANUFACTURING CHEMISTS AND IMPORTERS . . . PASSAIC, NEW JERSEY
Warehouses: **Providence, R. I.; Philadelphia, Pa.; Utica, N.Y.; Chicago, Ill.; Greenville, S. C.; Chattanooga, Tenn.**

A mixture which may be used for fine counts is:

Farina	79%
Wax	12%
Tallow	9%

1 gal. of water to 1 lb. of farina

For adding weight to the cloth China clay is the chief ingredient used, because of its easy assimilation with other ingredients, and its smoothness. French chalk is better in color, but is not so heavy and is more costly. Sulfate of magnesia and sulfate of soda are chiefly used for weighting yarns which are intended for bleaching or dyeing.

For what is termed medium sizing, that is, adding about 30 to 50 per cent. to the weight of the cloth, the following ingredients are used in various proportions, the proportion given being an example:

Flour	66% per 150 lbs.
Clay	26% per 150 lbs.
Tallow	8% per 150 lbs.
Chloride of magnesium	1 gallon*
Chloride of zinc	½ gallon*

For heavy sizing the proportions of clay and mineral ingredients are increased. In some cases over 100 per cent. is added to the weight of the yarn. The adhesive ingredient most used is wheat flour, as it carries the added ingredients better than farina or sago. Sometimes two parts clay to one of flour is used for very heavy sizing.

For 100 per cent. sizing the following proportions are given as an example:

Flour	37% per 250 lbs.
Clay	56% per 250 lbs.
Tallow	7% per 250 lbs.
Chloride of magnesium	5½ gallons*
Chloride of zinc	2½ gallons*

It will be noticed that chloride of magnesium and chloride of zinc are introduced along with China clay. Chloride of magnesium is a powerful softener as well as a weighting material, and one of its uses is to prevent the gritty feel which the addition of clay alone would give to the cloth. It has a great affinity for water, and has thus the power of attracting moisture to the cloth in which it is used. It is this which constitutes its softening effect.

With a size containing flour, clay and tallow only, there is a tendency towards the development of mildew. It is liable to develop at any time, either during manufacture of the size, weaving of the cloth, or even after a considerable lapse of time from its completion and delivery. In its first stage it may be removed from the fabric by washing, without leaving stain or injury; in the second stage it may be washed off, but leaves a stain or discoloration; and in the third stage it attacks the fiber and weakens the fabric to a considerable extent.

The use of chloride of magnesium as a softening agent attracts moisture, and it becomes necessary to use an antiseptic which will counteract the tendency of the cloth to mildew. Chloride of zinc has been found most satisfactory, and a sufficient quantity of this substance included in a size composition will effectually prevent or destroy the formation of such vegetable growth. Chloride of calcium has a similar effect to chloride of magnesium, but is scarcely as powerful. It may be used, however, in light sizings to prevent the yarn becoming too brittle.

Both hard and soft soaps may be used in size mixings. They dissolve fatty ingredients, and cause them to mix well. They have also the effect of causing China clay to boil thin, and prevent its spurting. But if used with the chlorides of magnesium, zinc or calcium, the size is liable to become lumpy, and the antiseptic properties are interfered with.

Soda may be added in small quantities to neutralize any free acid given off in the mixing and prevent the formation of iron mold. Coloring matters may be used in size to give the yarn any desired tinge.

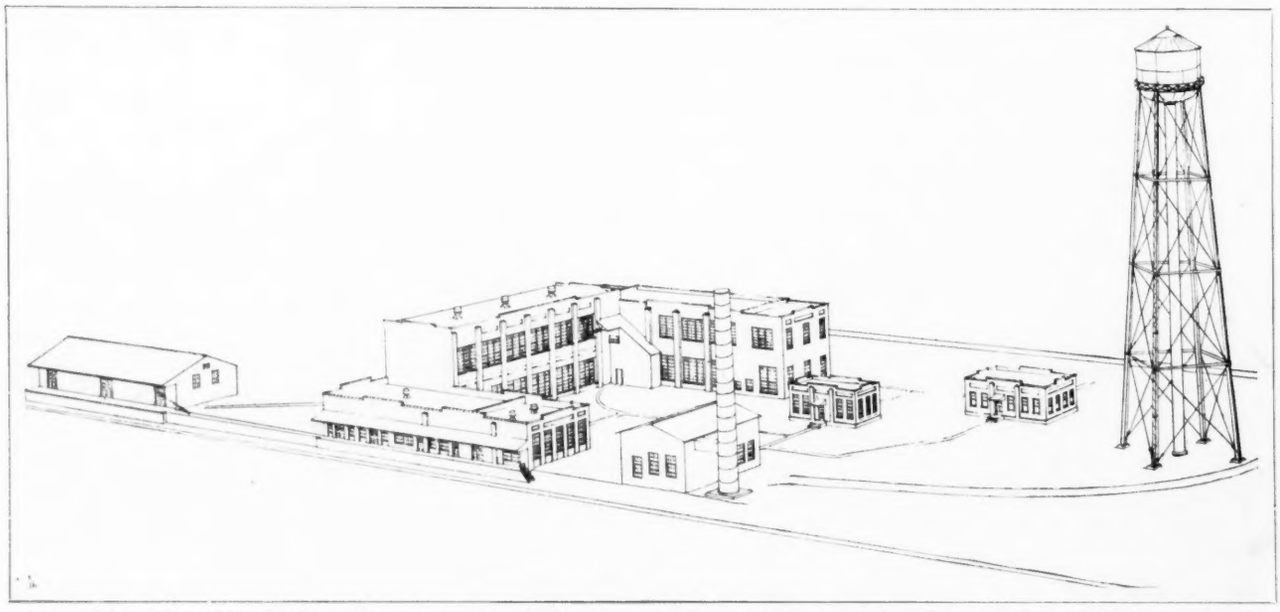
The yellowness of the cloth given in heavy sizing may be prevented by the addition of a suitable tinting blue; ultramarine, indigo sulfate, or a basic dyestuff.

Abstracted from "American Dyestuff Reporter," Apr. 5, '37, p. 177.

* *Both Chloride of Magnesium and Chloride of Zinc are commercially sold in liquid form, the percentage of the chloride varying from as low as 30% in some cases to as high as 45%. The above recipe is based upon a product approximating 40–45% of the content.*

Mothproofing Emulsion

Animal fibres such as wool, felt, fur, skins, feathers, silk and hair may be proofed against moth and fungi by treatment with a solution of chromium fluoride so that a definite quantity of chromium compounds equivalent to 0.65 per cent. of chromium fluoride is retained by the material. After steeping or padding with the aqueous solution excess is removed and the chromium compounds fixed on the fibre by drying at temperatures above 150° F. B. P. 413,445.



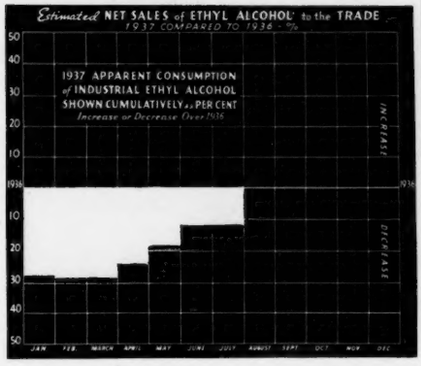
New Atlas Point Plant (Atlas Powder Company) in New Castle Co., Del., permitting them to substantially increase their production of Sorbitol and Mannitol.

ADVERTISEMENT—*This entire page is a paid advertisement.* *Prepared Monthly by the U. S. Industrial Chemical Co., Inc.*

SOLVENT NEWS

Reg. U. S. Pat. Off.

OCTOBER ★ A Monthly Series of Articles for Chemists and Executives of the Solvent-Consuming Industries ★ 1937


Estimated NET SALES of ETHYL ALCOHOL to the TRADE
1937 COMPARED TO 1936 - %
1937 APPARENT CONSUMPTION of INDUSTRIAL ETHYL ALCOHOL SHOWN CUMULATIVELY, in PER CENT
Increase or Decrease Over 1936
INCREASE
DECREASE
1936
JAN. FEB. MARCH APRIL MAY JUNE JULY AUGUST SEPT. OCT. NOV. DEC.

Apparent consumption of industrial ethyl alcohol from Jan. 1 to July 31, 1937, was 29,895,000 wine gallons. This is 11.3 per cent less than during the same period in 1936 when 33,675,000 wine gallons were consumed.

Advise Earmarked Paint To Combat Substitution

Urging that paint manufacturers take measures to protect themselves against "borderline" complaint cases where there is often serious difficulty in establishing the identity of a given paint, a foreign paint chemist has come forward with the suggestion that they earmark their products so that, even after a lapse of months, simple tests on the paint film itself will enable positive identification to be made.

His method is to add small, non-interfering amounts of characteristic substances which can be detected quantitatively by simple chemical analysis or physical examination.

Red Lead Paint

A metal protective paint composed of iron oxide, red lead, inerts and vehicles might, he declares, be so identified by adding to the product a definite amount of alcohol soluble red dyestuff.

Similarly, he explains, a varnish can be identified if it is formulated with 0.1% of strontium oleate dissolved in the thinner.

For white enamels he suggests the addition of 1% of an inert which would not ordinarily be found there as an impurity.

Farmers Borrow Lacquer Solvent for Poison Bait

KANSAS CITY, Mo.—A chemical hitherto known chiefly as a lacquer solvent has been a major accessory weapon in the recent war against grasshoppers on western plains, reports from here disclose.

The chemical is a technical grade of amyl acetate manufactured by the U. S. Industrial Chemical Co., Inc. It is incorporated in various types of poison bait, where because of its characteristic odor, it acts as a lure for the pests migrating in search of food from mountain states to the great grain-growing states.

This year's invasion of grasshoppers, which beleaguered farmers characterized as "the worst in history," has been combatted on a more extended scale than in previous years because of the increased governmental funds available.

Vast New Possibilities for Shellac Strengthen Old Industry's Position

Research on Pure Lac Resin, Sulphited Lac, Accelerators and New Molding Techniques Yield Far-Reaching Results

Watch shellac! That in effect summarizes world interest in recent developments of an industry revitalized by vigorous research. For this research has repudiated emphatically any lingering ideas that shellac has had its full possibilities explored.

An indication of the important developments to come is contained in first tests on pure lac resin—a material present in wax-free lac in amounts ranging from 70-85% and which has been isolated by means of its characteristic insolubility in ether.

When and if production of pure lac reaches commercial stature—and the objective now seems within reach—the possible consequences are great. Pure lac, chemists point out, has softening and melting points of about 84° C. and 95° C. respectively as compared with 64° and 72° for the original shellac.

In experiments on electrical wire enamels, fruit and vegetable can lining lacquers, and foil lacquers, this pure lac showed great adhesion to metals as well as superior hardness and flexibility. In some experiments it exhibited low solvent retentivity and increased water resistance. Tests in plastic mouldings demonstrate that it hardens more rapidly than ordinary lac.

Equal interest is now centered in sulphited lac, produced when shellac is dispersed in sulphurous acid, alkali sulphite or bisulphite. Under certain processes it is stated that sulphited lac may be "salted out" from its dispersions, air-dried and, if stabilized properly, retain its solu-

(*Continued on next page*)

Print and Wax Paper In Less Time With New Ink

NEW YORK, N. Y.—Under a new process, paper printed with special nitrocellulose ink and dipped into molten paraffine emerges in an incredibly short time with the ink "set" so that it is non-smudging.

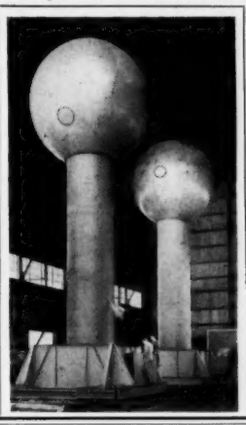
The key to the process, according to the patent issued to a chemist in this city, is a nitrocellulose solvent having (1) a vapor pressure low enough to keep the ink from drying on the press and (2) miscibility with paraffine.

Dimethyl phthalate is mentioned as a specific example.

Dipping the sheet into wax (a non-solvent for nitrocellulose), the patentee explains, dilutes the dimethyl phthalate to such degree that the nitrocellulose is instantly precipitateed as a hard, adhesive, non-smearing film which binds the ink pigment to the sheet.

The inventor declares that this method of printing might be used in other coating processes and for printing cardboard, transparent cellulose sheeting, diaphane, etc.

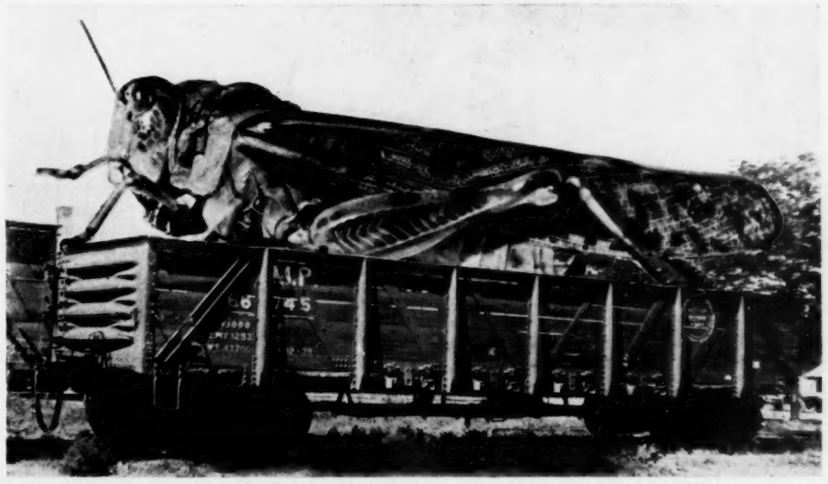
An emulsion of oil lacquer in water may be produced by dissolving the lacquer in ethyl ether and absolute alcohol and treating this solution with water, according to a recent patent.



7,000,000 VOLTS

(Left) — Shellac - impregnated paper tubes support and insulate aluminum balls under 7,000,000 volts potential at M. I. T.

Courtesy William Zinsser & Co.



THEY GROW 'EM BIG OUT WEST. The photographer in a prankish mood created this monster to show how grasshoppers look to a farmer having nightmares. Amyl Acetate is used in the war against these pests. (See story at left.)

Copyright P. D. Conard

ADVERTISEMENT—*This entire page is a paid advertisement.*

OCTOBER ★ **SOLVENT NEWS** ★ 1937

Slower Wall Drying With Butyl Alcohol Aids Mural Artists

MEXICO CITY, Mex.—The dream of mural artists in all ages—a preparation that will retard the rapid drying of walls and thus permit an artist to work for longer periods in perfecting his scenes—has at last been realized, a report from this citadel of modern mural art states.

A mixture of butyl alcohol and water is sprayed on the wall every three or four hours, day and night.

Walls so treated can be kept wet, it is said, for working and reworking up to 56 hours instead of the former limit of 18 to 23 hours, with the result that colors applied at any time during this period are absorbed uniformly.

Vast New Possibilities For Shellac Predicted

(Continued from previous page)

bility in water over a considerable period.

Sulphited lac, chemists feel, may give shellac an important entry into the field of emulsion paints, emulsion lacquers and baking emulsions which are rapidly increasing in importance.

One authority says that in the plastics field "the use of sulphited lac in the production of moulding powders is almost equivalent to the discovery of a new resinous material" because this type of shellac is in an advanced stage of polymerization. It does not melt as ordinary lac and consequently has considerable capacity for heat resistance without being subjected to after-cure treatment.

In Plastics

Finding that certain chemicals (urea, thiourea, hexamethylene tetramine and others) act as accelerators or hasten the cure of shellac, observers agree that shellac is bound to consolidate its already important position in the plastics field, which is now estimated to take 40% of the shellac output for phonograph records and further large quantities for electrical equipment, grinding wheels, mica-plate manufacture, etc.

In fact, developments with shellac as a plastic have progressed along many lines. Compositions have been obtained which it is said will stand temperatures up to 550° F. without appreciable warping and which can be drawn hot from the mold. New techniques in moulding and the incorporation of other plastic materials have brought about equally notable advances in the manufacture of shellac insulators.

DISSOLVE SHELLAC

Not a new development, but assuming greater importance, is the use of anhydrous alcohol and anhydrous Solox with shellac.

Many manufacturers formulating shellac with nitrocellulose and resins for waterproof varnishes like the blending features of the anhydrous solvents.

Anhydrous Solox, U.S.I.'s proprietary solvent, has a mild, unobjectionable odor and is a stronger solvent than ordinary denatured alcohol. A leaflet explaining the advantages of Solox may be obtained from U.S.I.

Solox Cleans Watches Better, Says Jeweler

TAMPA, Fla.—Further demonstration of the advantages of Solox over ordinary denatured alcohol was made recently when a local watchmaker used U. S. I.'s proprietary solvent for cleaning watches and jewelry. After many tests, this experimenter reports, "Solox has more cleansing and evaporative qualities than ethyl alcohol with less tendency to rust and corrode. The presence of ethyl acetate . . . assists in dissolving old oils and greases. Solox does not have the offensive odor of other commercial alcohols. It is also . . . very satisfactory for the jeweler's alcohol lamp."

Super Pyro In Tractor Tires

Super Pyro, U.S.I.'s popular-priced, premium quality anti-freeze is now being used in tractor tires. Farmers like to break up their ground before the final thaw by running heavy tractors over it. Added weight is secured by filling the tires with water. To prevent this water from freezing a 50-50 mixture of Super Pyro is used.

Asphalt dissolved in Amyl Acetate makes a suitable ink for marking pyroxylin plastics according to a recent circular of the National Bureau of Standards. The solution may be applied with an ordinary pen it is stated.

TECHNICAL DEVELOPMENTS

For further information write to U.S.I.

For protecting wood construction against decay and attacks by termites and other insects, a new wood preserver was recently announced. The material is said to be insoluble in water and to have a high boiling point, making for longer protection. **(No. 21)**

U S I

A new thickening and emulsifying agent in the form of a white, wax-like solid—soluble hot in alcohols, oils and organic solvents—is said to give slightly acid solutions when dispersed in water. It also has uses as a lubricant and as a suspending agent, says the manufacturer. **(No. 22)**

U S I

A new textile printing lacquer is said to combine washability, unusual flexibility and adhesion. It is easily applied to rayon, acetate silk, crepe rayon, oiled silk or pliofilm, according to the manufacturer. Various colors are available. **(No. 23)**

U S I

Flameproofing material for textiles, paper, leather, etc., recently developed, will not injure or change the appearance of any fabric not harmed by plain water, according to the manufacturer. Applied by dipping or spraying, without special equipment, the material is said to be tenacious, invisible and effective. **(No. 24)**

U S I

A new enamel for concrete is said to overcome disadvantages of oil base enamels, especially where moisture is present. Made from a pliolite base, the enamel is not affected by lime salts or other minerals in the concrete. The manufacturer also claims that it protects against concrete dusting and dries with a high permanent gloss. **(No. 25)**

U S I

A plastic sealing material for cold-storage cabinets is now on the market. It is said that the material can be extruded into small beads and ribbons at 0 deg. F., is non-oxidizing, odor-free and will not melt at 350 deg. F. **(No. 26)**

U S I

Synthetic gum in liquid form, which can be applied cold by brushing, spraying or dipping, was announced recently. It is said to withstand the action of hot or cold acids (nitric excepted) or alkalies. Suggested uses are on laboratory tables, fans handling corrosive fumes, plating racks, etc. **(No. 27)**

U S I

Particle size distribution of fine dry powdered materials can now be analyzed according to the manufacturer of a new roller particle size analyzer. Applicable to most materials finer than 200 mesh and greater than colloidal, the analyzer is said to give fractions as small as 0 to 5 or 0 to 3 microns conveniently. **(No. 28)**

U S I

Stronger seams in rayon are said to result from a new finish on the market. The finish is reported to lock and set yarns, giving the fabric additional strength that holds fast at the seams. Repeated dry cleanings are said to have relatively no effect. **(No. 29)**

U.S.I. INDUSTRIAL ALCOHOL CO.
INDUSTRIAL CHEMICAL CO., INC.

WORLD'S LARGEST PRODUCERS OF ALCOHOL DERIVED SOLVENTS

Executive Offices: 60 East 42nd Street, New York, N. Y. Branches in all Principal Cities

AMYL ALCOHOLS
Refined Amyl Alcohol
Refined Fusel Oil
Secondary Amyl Alcohol

ETHYL ALCOHOLS
Specially Denatured
Completely Denatured
Anhydrous Denatured
Absolute—Pure
C.P. 96%—Pure and Denatured
Pure (190 Proof)—Taxpaid, Tax Free

*SOLOX—The General Solvent
*SUPER PYRO—The premium Quality Anti-freeze

BUTYL ALCOHOLS
Normal and Secondary

ISOPROPYL ALCOHOL

METHYL ALCOHOLS
95%, 97% and Pure
METHYL ACETONE

ETHYL ETHER
U.S.P. and Absolute (A.C.S.)

COLLODIONS
U.S.P., U.S.P. Flexible and Photo
NITROCELLULOSE SOLUTIONS

DIAMYL PHTHALATE
DIBUTYL PHTHALATE
DIETHYL PHTHALATE
DIMETHYL PHTHALATE

ACETIC ETHER
AMYL ACETATES
High Test Commercial
Technical Secondary
BUTYL ACETATES
Normal and Secondary
*DIATOL
DIETHYL CARBONATE

ETHYL ACETATES
85-88%, 95-98%, 99% and U.S.P

ETHYL LACTATE
ISOPROPYL ACETATE
AMYL PROPIONATE
BUTYL PROPIONATE

ANSOLS
Ansol M Ansol PR

ACETOACETANILID
ACETOACET-O-CHLORANILID
ACETOACET-O-TOLUIDID
ETHYL ACETOACETATE
SODIUM ETHYL OXALACETATE
PARACHLOR-O-NITRANILINE

ACETONE
DIBUTYL OXALATE
DIETHYL OXALATE
ETHYL CHLORCARBONATE
ETHYLENE
URETHANE

*CURBAY
POTASH BY-PRODUCTS

*Trade-mark registered

'35 Ink Production Rose 32% Over '33 Figure

"Soapers" Seek Soapless Soap Products—Arsenates to be Colored—Shingle Companies Merge—Stein, Hall's New Laboratory—Other News of the Specialties Field—

U. S. '35 production of printing ink had a total value of $34,534,951, an increase of 32% over the '33 figure, according to a report of the Bureau of the Census made up from returns of the biennial census of manufactures. Of the total, $32,151,519 was the value of 148,913,601 lbs. of printing ink and the remainder represented other products, including base ink. Number of wage-earners in the industry in '35 was 2,370, an increase of 13.2% over 1933.

Comparative statistics for the two years follow:

	1935	1933
Number of establishments	191	160
Wage earners (average for the year)	2,370	2,094
Wages	$3,233,728	$2,663,369
Cost of materials, containers, fuel, and purchased electric energy	$18,554,558	$12,603,500
Products, total value	$34,534,951	$26,166,304
Printing inks, including lithographing ink (finished):		
Pounds	148,913,601	.....
Value	$32,151,519	.....
Other products, including base ink (semi-finished), value	$2,383,432	.....
Value added by manufacture	$15,980,393	$13,562,804

Rush on for Soapless Soaps

Tide, business paper for ad-men, devotes a page in its Sept. 15th issue to review the situation in soapless soaps. Reveals that Colgate, Palmolive, Peet, according to rumors, is experimenting with Igepons, on which they are said to have lessee patent rights from the I. G. Company is reported to have an unnamed washing powder and a shampoo called Halo about ready to market. According to *Tide*, rumors are also circulating that Standard Oil may enter the soapless detergent business.

Carbona is now in the soapless soap business with Carbona Soapless Lather for rugs, and Pop, suggested for dishwashing. Latter product will be treated to an extensive campaign as soon as distribution details are completed.

With the Associations

All details of the 5th Annual Meeting of the National Pest Control Association, to be held at the Hotel Peabody, Memphis, Tenn., Oct. 25-27th, have been completed, and the largest turnout in the history of the organization is expected. Copies of the program and other information can be obtained from the secretary, William O. Buettner, 3019 Fort Hamilton Parkway, Brooklyn, N. Y.

Council for Paint Styling, established as a result of a series of conferences held in recent months under the auspices of the Trade Sales Committee of the N.P.V. & L. A., Inc., will present in dramatic, visualized form the broad subject of American color trends before the session of the Trade Sales Committee to be held at the Netherland Plaza Hotel, Cincinnati, on Thursday afternoon, Oct. 28th. Program, it is expected, will be the dominant feature of the industry's annual Convention, which opens on Oct. 27th.

The Associated Exterminators & Fumigators of N. Y. has appointed W. J. Parker as executive secretary. New offices will be opened at 7 E. 44th st., N. Y. City.

The Synthetic Resin Manufacturers Association has appointed Foster D. Snell, Inc., consulting chemists and chemical engineers, to act as the official laboratory of that association.

The National Safety Council, 20 N. Wacker Drive, Chicago, has just issued a new leaflet on "Fumigating Ships."

Wilbur F. Smith, associated with The Alderman Co., Pasadena, Calif., has been elected president of California Structural Pest Control Board, succeeding M. G. Jorgenson.

Pink Color For Arsenates

Manufacturers of agricultural insecticides have notified the Surgeon-General of the Public Health Service that hereafter all white arsenates, such as calcium and lead, will be given a distinctive pink color to prevent their being used by mistake for other powders used in foods. Color will be added to all new production for the 1938 crop year.

This safety measure was adopted by voluntary agreement among the manufacturers with the approval of the Public Health Service and is the result of a 5-year study.

Promotional Activities

B. T. Babbitt, Inc., manufacturer of Bab-O and Babbitt's lye, will launch an extensive newspaper advertising campaign this Fall. More than 100 daily and Sunday newspapers will be scheduled. Company's radio program, "David Harum," continues. L. J. Cumpert, director of sales, announced that H. W. Flexner, formerly director of advertising, has been advanced to assistant director of sales and that Robert Brenner, formerly merchandising manager, is now advertising and merchandising manager.

P. & G. has transferred its advertising account on "Chipso" to Pedlar and Ryan. Company's policy is to place competitive products with competitive agencies, according to Ralph F. Rogan, advertising director.

The Berlou Manufacturing Co., Marion, Ohio, maunfacturing Berlou mothproofing compound, has appointed the Jay H. Maish Co., same city, to direct its advertising campaign.

Raymond F. Peasback has been appointed director of advertising and sales promotion of the agricultural division of National Oil Products, in addition to his other duties.

To Judge Packages

Vaughn Flannery, vice president in charge of design at Young & Rubicam; William M. Bristol Jr., vice president in charge of production of Bristol-Myers; George R. Webber, in charge of package development at Standard Brands; Lita Bane, professor of home economics at the University of Illinois, and H. W. Brightman, vice president of L. Bamberger & Co., have been named as judges in the 1937 All-American Package Competition, sponsored by *Modern Packaging Magazine*. Number of entries for this year's competition will be greater than last year's 12,000 packages, it was predicted. Competition closes on Dec. 18th and judging will take place immediately thereafter.

Personnel Changes

Robert A. Bruce, with W. H. & F. Jordan, Jr., Manufacturing Co., Philadelphia, for the past 6 years, has been made a vice-president. He is very active in A. A. T. C. & C. affairs and was at one time an officer of the Philadelphia section.

Miss Diana Johns has been appointed as fashion and promotion director for Impregnole Process finish made by Warwick Chemical. She will cooperate with Harold W. Rose, general sales manager of the Impregnole Division.

Dr. Susie E. Doebbeling who has been connected with the Dept. of Chemistry of Columbia, specializing on enzyme work, became associated on Sept. 15th with Takamine Laboratory, Inc., Clifton, N. J., where she will continue her research on enzymes, with particular attention to their application in industry.

John C. Gehant, formerly superintendent of Devoe's Chicago plant, has been transferred to Louisville as superintendent of lacquer and varnish plants, Peaslee-Gaulbert Paint and Varnish. His place is taken by G. R. Harrington who has been away on an extended leave of absence.

New Products of the Month

New products in the household field include "Sanovan" a new household deodorant, produced by the Cosmos Co., Boston; A. C. Horn Co., Long Island City, is introducing "Hornspar" a new varnish fortified with Bakelite resin; a new scented floor wax by Baldwin Laboratories, Saegertown, Pa., called "Dwinax."

Du Pont is offering a water-repellent soft finish to the textile field under the name "Du Pont Permanent Water Repellent."

Roxalin Flexible Lacquer, Elizabeth, N. J., has released a product summary on "Blue Knight Roxyn C" a new synthetic-

type, air-drying or baking flexible lacquer. Same company is supplying data on "Cadmium Water Dip Lacquer No. 3850," a clear, cellulose type, air-drying lacquer, which prevents the oxidation, fuming or marring of cadmium plate.

Chem-"X" Research Laboratories, 63-65 77 st., Elmhurst, L. I., announces as a companion line to Chem-"X" Soot Destroyer—the development of a Chem-"X" Boiler Water Cleaner, specially suitable for oil burner, and stoker fired systems.

International Printing Ink, N. Y. City, is now offering "Everyday" job inks in tubes as well as in cans.

Newcomers in the Field

The Thos. E. O'Conner Co., 410 Hart st., Chicago, is a newcomer in the coatings field.

Glues, adhesives, and other specialties will be made by the Berry Manufacturing Co., 6761 Highland ave., Silverton, Cincinnati, Ohio. Steven J. Berry is president.

Arizona Paint and Chemicals, Inc., has opened a modern plant at Phoenix, Ariz. Company's products will be sold under "Deer-O" trade-name.

Atlas Chemical is a new industry at Marietta, Ohio, and will make automotive specialties. C. H. Whitaker is chief chemist.

Siron Plastics, Inc., will make plastics at Wellston, Ohio.

Specialty Company News

Neva-Wet Corp. of America, N. Y. City, has announced that hereafter all materials processed by it will carry tags, "specifying exactly the character and construction of such output."

Dewey & Almy Chemical of Canada, has brought suit in the Exchequer Court of Canada against distributors of certain canned foodstuffs imported from Japan alleged to be sealed with sealing compounds which infringe the company's patents.

Kirkpatrick Specialties Co., Los Angeles, Calif., manufacturer of specialties for the dry-cleaning trade, has enlarged its plant and general offices. Several improvements have been made in the leather cleaning and finishing products produced. Company is launching an educational campaign "Leather Goods Can Be Cleaned."

The Minnesota Linseed Oil Paint Co., which recently acquired Hoosier Paint Wks., Fort Wayne, has purchased the Chi-Namel paint and varnish lines.

Work has begun at the New London plant of the Ernst Bischoff Co. Most of the executive staff has arrived from N. Y. City and have taken up their duties.

Sigmund Ullman Co., a division of General Printing Ink, 100 6th ave., N. Y. City, has just published a specimen book showing its gloss inks for labels and folders on actual stocks used in various fields.

A $100,000 fire destroyed the plant of the Cotto-Waxo Co., St. Louis, manufacturer of household polishes and specialties. Other parts of the building were used by Monsanto and Speare Supply, a supplier of laundry specialties.

The Ruberoid Co., manufacturer of asphalt and asbestos building products, has acquired the physical assets of the Gold Seal Asphalt Roofing Co., Minneapolis.

New England Chemical and Paint has opened a Boston office at 10 High st., with J. H. Mulligan in charge. Company handles industrial chemicals, paints, and specialties.

Harco Products Co., St. Louis, has taken over Zip Products, Inc., and will consolidate line of industrial chemical specialties.

Louisville Chemical's exhibit at the recent Kentucky State Fair drew much favorable comment. Company produces a line of pest control specialties.

P. & G. has introduced Ivory Soap in a new "purity-sealed" transparent, waterproof paper.

Doll Brands has taken a building at Huntington Station, L. I., and will produce a line of specialties in the agricultural and veterinary fields, also a complete line of household specialties. Dr. C. E. Doll is president.

Hilton-Davis Chemical is planning a $1,000,000 building and expansion program at Cincinnati. News was revealed through an SEC application.

After many neighbors had registered vigorous opposition, the Swampscott (Mass.) Board of Selectmen voted recently to reject the application of the United Chemical Products Co., to manufacture shoe dressings at 47 Essex ave.

The 5-story brick plant of the Savogran Co., on India Wharf, Boston, was destroyed by fire Aug. 27th.

Platers Supply, Inc., Cleveland, has moved into larger quarters at 2059 Hamilton ave. New phone is Prospect 6670.

Milwaukee Soap is in new quarters at 1363 N. 42nd st.

Arctic Roofing, manufacturer of asphalt-base roll felt roofing and composition asphalt shingles, will open a plant near the Edge Moor plant of Krebs Pigment, according to the Wilmington Chamber of Commerce.

Glidden has purchased a plant adjoining the factory of its subsidiary, A. Wilhelm Paint Works, Reading, and will remodel.

The Endo Chemical Co., formerly of Greenville, S. C., has opened its plant and offices at 4701 N. Main st., Columbia, S. C., and will manufacture a full line of disinfectants and insecticides.

Meet on Soap Standards

The American Society for Testing Materials' Committee D-12, in charge of formulating standards and specifications for soaps and detergents, will have its first fall meeting in N. Y. City on Oct. 19th instead of Oct. 4th.

Newspaper Reports Exaggerated

Newspaper reports of the fire at the Weehawken plant of S. B. Penick & Co., botanicals and crude drugs, etc., were greatly exaggerated. Company is making deliveries in a normal fashion and repairs at the plant are being rushed.

Personalities in the News

S. Bayard Colgate, president, Colgate, Palmolive, Peet, is on an industrial committee of prominent business men who will present Jersey City as a desirable industrial location.

Dr. Henry Wenker, of the research staff of Apex Chemical, has just recently returned from a 3 months European tour, during which time he had an opportunity to investigate new products and methods of manufacture, to present before the directors at the next staff meeting.

W. B. Hanna, 72, owner of Crown Soap, died Sept. 17th of a heart attack.

Shingle Companies Combine

Merger of the two largest companies in the U. S. dealing in special shingles and stained shingles, Creo-Dipt Co. of North Tonawanda and Weatherbest Co., North Tonawanda, was announced in Buffalo on Sept. 16th by H. P. Kendall, president and general manager of Creo-Dipt. Merger follows purchase of the capital stock of Creo-Dipt by a group of Niagara frontier business men.

Diversey Appoints Service Men

Diversey Corp., Chicago, manufacturer of detergents and cleaning specialties, has appointed additional service men: A. C. Elkerton, Boston; B. H. Gregg, Spokane, Wash.; A. E. Harriman, Kansas City; K. Hassler, San Francisco; W. B. Hinds, Harrisburg, Pa.; G. H. Jackson, Atlanta; R. Mordue, Columbus, Ohio; M. W. Nay, Youngstown, Ohio; J. R. Nelson, Rochester, Minn.; H. Richter, Mankato, Minn.; H. F. Sarman, Jacksonville; J. A. Thompson, Omaha.

Stein, Hall's Textile Laboratory

Stein, Hall has established a new laboratory at Providence, R. I., to deal with problems on sizing, printing and finishing in the textile field. F. G. LaPiana will be in charge with David Truax as assistant. Frank W. Perry will be resident chemist.

The N. Y. City laboratories of the company are also being enlarged and M. Cushing has been added to research on pure scientific work on starch and dextrin.

MANUFACTURING
CHEMISTS
SINCE 1849

PFIZER QUALITY

ASCORBIC ACID

$C_6 H_8 O_6$

PFIZER I–Ascorbic Acid (Cevitamic Acid) is a white to yellowish-white fine crystalline powder; exceptionally free from metallic impurities and of excellent stability. It is derived from dextrose, or grape sugar, by carefully controlled processes which ensure its continued high purity and uniformity.

Pfizer I–Ascorbic Acid meets all the American Medical Association tests for Cevitamic Acid, as published in New and Non-Official Remedies for 1937.

CHAS. PFIZER & CO., INC.

NEW YORK
81 MAIDEN LANE

CHICAGO
444 W. GRAND AVE.

Chemical Specialty Patents

Refractory product comprising plurality of refractory ingredients one of which is merwinite. No. 2,089,970. Harley Clyde Lee, Columbus, O., to Non-Metallic Minerals, Inc., Cleveland, O.

Abrasive wheel composed of abrasive grains united by a heat vulcanized bond of shellac, in which sulfur and an activator have been mixed. No. 2,090,104. Orello S. Buckner, Northboro, Mass.

Stabilized insecticide of plant origin, comprising rotenone, individual particles of which are coated with a dry chlorophyll green film. No. 2,090,109. Mayne R. Coe, Washington, D. C.

Preparation hydraulic fluid consisting of solution of isobutanol and a glycol. No. 2,090,263. Douglas V. Moses to du Pont, both of Wilmington, Del.

Manufacture bonded abrasive article for abrading hard metal carbide compositions; abrasive material consisting of silicon carbide grains, including clear green crystals. No. 2,090,274. Prescott H. Walker and Arthur H. Prey, to Carborundum Co., all of Niagara Falls, N. Y.

Hand brushing apparatus for painting, coating or cleaning. No. 2,090,301. Wm. Brand Makins, London, England.

Production cement clinker on blast grate, first mixing wet ground raw cement slime, fuel and granular sintered material. No. 2,090,363. Helmut Wendeborn, Frankfort-am-Main, Germany, to American Lurgi Corp., New York City.

Liquid fuel comprising emulsion of fuel oil with water, water containing compound of group of boric acid and water-soluble borates, also an emulsifying and stabilizing agent. No. 2,090,393. Arthur A. Roberts, London, England, Arthur Roberts and Clifford Wilbur Smith, administrators of said Arthur A. Roberts, deceased.

Production improved tars for use in road construction, particularly their binding properties, incorporating in tar an unchlorinated polyvinylchloride. No. 2,090,394. Alfred Sirot and Georg Wick, Bitterfeld, Germany, to I. G., Frankfort-am-Main, Germany.

Fixing composition for use in after-treatment of dyed materials; comprising a fixing reagent containing a water-soluble metallic salt and an acid binding agent. No. 2,090,396. Edward S. Chapin and Walter C. Durfee, Boston, Mass.

Manufacture concrete, grinding clinker with sufficient water to discharge flowing mixture of cement fineness. No. 2,090,421. Harry McC. Larmour and Stephen G. Pierce, Jr., Merced, Calif.

Product for water purification, composed of lignite or brown coal in which oxide of iron has been incorporated. No. 2,090,467. George Borrowman, Evanston, Ill.

Production lecithin hydrate; first providing a homogeneous mixture of water, alcohol, and phosphatid containing material. No. 2,090,537. Albert A. Lund, Port Washington, N. Y.

Moldable battery box composition; composed of asphalt binder, filamentary glass, and acid resistant mineral matter of absorbent character. No. 2,090,577. Edward R. Dillehay, Glen Ellyn, Ill., to Richardson Co., Lockland, O.

Organosol comprising finely divided vitreous enamel frit uniformly dispersed in a liquid organic silicon compound. No. 2,090,617. Rudolph S. Bley, Elizabethton, Tenn., to Porcelain Enamel & Mfg. Co. of Balto., Balto., Md.

Organosol comprising finely divided enamel frit uniformly dispersed in a liquid organic boron compound. No. 2,090,618. Rudolph S. Bley, Elizabethton, Tenn., to Porcelain Enamel & Mfg. Co., of Balto., Balto., Md.

Improved hydraulic cementitious gypsum materials, using phosphoric acid and sodium phosphate. No. 2,090,625. Robert S. Edwards, Milton, Mass., to Rumford Chemical Works, Rumford, R. I.

Casein solution characterized by its stability and uniform viscosity over long periods of time. No. 2,090,630. Carl Iddings, Staten Island, N. Y., to Muralo Co., Inc., corp. of New York.

Preparation belt dressing. No. 2,090,687. Chauncey M. Lee, Lodi, Calif.

Emulsoid ink for planograph printing, consisting of a pigmented varnish vehicle of a planograph ink and an aqueous ink-repellent composition containing an organic colloid. No. 2,090,704. Geo. S. Rowell to Addressograph-Multigraph Corp., both of Cleveland, O.

Plastic, non-hardening cleaning composition, containing a non-hardening polymer of isobutylene and a pulverized inert mineral filler. No. 2,090,708. August J. Stahl, Kenilworth, N. J., to Standard Oil Development Co., corp. of Del.

Soldering flux comprising addition compound of a metal halide and an organic base material. No. 2,090,846. Herbert E. Lawson to Burgess Battery Co., both of Freeport, Ill.

Method sintering cement mixes. No. 2,090,868. Reed W. Hyde, Summit, N. J.

Process resisting cotton against coloration by leuco-esters of vat dyestuffs. No. 2,090,890. Samuel Howard and Alec Wormald, Blackley, Manchester, to Imperial Chemical Industries, Ltd., corp. of Great Britain.

Preparation composition containing chlorinated caoutchouc. No. 2,090,901. Leo Rosenthal, Leverkuesn-Wiesdorf, and Reinhard Hebermehl, Cologne-Deutz, Germany, to I. G., Frankfort-am-Main, Germany.

Water soluble composition comprising a saponifiable oil and ricinoleic acid. No. 2,090,909. Ivor M. Colbeth, East Orange, N. J., to Baker Castor Oil Co., New York City.

Chemical cleaning composition for coal ash to remove coarse material therefrom. No. 2,090,932. Elizabeth Blessing, New York City.

Spray apparatus. No. 2,090,950. Milton S. Robertson, Campbell, Calif., to Independent Crop Dusting, Inc., San Francisco, Calif.

Product for use in electroplating, etc., and serving as solvent for metal or metal compounds to be plated; a lignin material which has been subjected to an oxidizing treatment. No. 2,090,966. Wilhelm Sailer, Schwaan, Mecklenburg, Germany, to Mead Research Engineering Co., Dayton, O.

Emulsifiable anhydrous spray oil composition, being solution of a liquid plant spray mineral oil and a water insoluble aliphatic unsaturated alcohol. No. 2,091,062. Wallace J. Yates, Martinez, Calif., to Shell Development Co., San Francisco, Calif.

Mothproofing composition, comprising mixture of an alkali metal fluoride, sodium chloride, sodium silicate, sodium phosphate, and Nekal. No. 2,091,075. Bernard L. Landers, Brookline, Mass., to Philipp Bros., Inc., corp. of New York.

Dry cleaning emulsion; water-in-oil emulsion comprising a hydrocarbon dry cleaning solvent having dissolved therein a long chain aliphatic alcohol and an oil-soluble salt of the sulfuric acid ester of oleyl alcohol. No. 2,091,121. Samuel Lenher and Luther B. Arnold, Jr., to du Pont, all of Wilmington, Del.

Spray residue removal compound for fruit; solution of an acid, a sulfonated hydrocarbon, and ammonium chloride. No. 2,091,123. Harry C. McLean and Albert L. Weber to Endowment Foundation, all of New Brunswick, N. J.

Manufacture flexible abrasives, mixing abrasive material and a rubber dispersion, adding fillers, vulcanizers, and vulcanization accelerators, incorporating a gas evolving substance and a decomposition catalyst. No. 2,091,184. Theodor Pohl, Frankfort-am-Main, and Josef Schneider, Oberursel, Germany, to Deutsche Gold und Silber Scheideanstalt vormals Roessler, Frankfort-am-Main, Germany.

Process stabilizing wool bleaching baths; first using dilute solution of hydrogen peroxide which contains metallic catalytic impurities. No. 2,091,186. Jos. S. Reichert and Ralph B. Elliott, Niagara Falls, N. Y., to du Pont, Wilmington, Del.

Detergent composition for removal ink, dye, carbon paper and similar stains from body without injury to skin through use of aqueous solution containing titanium trichloride, glycerol and ethyl alcohol. No. 2,091,220. Lee F. Supple, Chicago, Ill.

Preparation casein glue by decomposing casein with an alkali metal silicate. No. 2,091,325. Walther Luetzkendorf, Mannheim, Germany, to I. G., Frankfort-am-Main, Germany.

Removal spray residue from fruit; using solution of hydrochloric acid and an alkali metal salt of a sulfonated hydrocarbon. No. 20,490. Reissue. Harry C. McLean and Albert L. Weber to Endowment Foundation, all of New Brunswick, N. J.

Mottled paint; as a base liquor adapted undiffusedly to support relatively mottled enamel globules, an unpigmented casein solution. No. 2,091,466. Peter Busch, Newark, N. J., to Rudolf Wildermann, New York City.

Composite refractory body comprising a plurality of layers of pure thorium separated by a layer of tungsten. No. 2,091,554. Hallam E. Mendenhall, Summit, N. J., to Bell Telephone Labs., Inc., New York City.

Finishing bath to render textiles crease, crush and crumpling resistant; bath containing soluble salts of boric and salicylic acids. No. 2,091,568. Alfred Pierre Honoré Pouteaux, Ethirey, France, to J. B. Martin Co., Norwich, Conn.

Manufacture article of self-bonded granular material. No. 2,091,569. Raymond R. Ridgway and Bruce L. Bailey, Niagara Falls, N. Y., to Norton Co., Worcester, Mass.

Preparation free-flowing, comminuted, granular refractory materials, by burning dolomite, etc., to clinker, and coating surface of clinker with mineral oil. No. 2,091,610. Walter W. Patnoe, Maple Grove, O., to Basic Dolomite, Inc., Cleveland, O.

Solution for stopping runs in hose, containing carbon disulfide, rosin gum dammar, and carbon tetrachloride. No. 2,091,740. James L. Powell, Norfolk, Va.

Vermifuge; lethal dose of toxic substance incorporated in a substance of colloidal nature. No. 2,091,840. Grover D. Turnbow, Oakland, Calif.

Emulsifying agents, composition containing polyhydric alcohol incompletely esterified with fatty acid of high molecular weight and water-soluble soap. No. 2,091,886. Wm. F. Schanzle, Cincinnati, O., and Albert S. Richardson, Wyoming, O., to Procter & Gamble Co., Cincinnati, O.

Production emulsions; emulsifying polyhydric alcohols partially esterified with fatty acids of high molecular weight, with water or aqueous solutions in presence of soap. No. 2,091,887. Wm. F. Schanzle, Cincinnati, O., and Albert S. Richardson, Wyoming, O., to Procter & Gamble Co., Cincinnati, O.

Insecticidal and fungicidal emulsion comprising a mineral oil, a finely-divided solid dispersing agent, a gum emulsion-stabilizing agent, a preservative for the gum, and an alkaline chemical. No. 2,091,935. Theron P. Remy, Los Angeles, Calif., and Waldersee B. Hendrey, Beacon, New York, to Texas Co., New York City.

Preparation wetting agents and detergents; sulfating a glycol having 8 to 38 carbon atoms, having hydroxyl groups attached to adjacent carbon atoms, and forming a salt by neutralizing sulfate. No. 2,091,956. Roland Geo. Benner, Carneys Point, N. J., to du Pont, Wilmington, Del.

Quick-drying printing ink for use on non-absorbent materials; comprising cellulose nitrate, resin gum copal, ester gum, a non-volatile plasticizer, soft soap, coloring ingredient, and magnesium carbonate. No. 2,091,966. Edw. M. Davidson to Continental Can Co., Inc., both of New York City.

Dehumidifying solution, comprising aqueous solution containing lithium bromide and lithium chloride. No. 2,091,983. Sheldon B. Heath and Forest R. Minger to Dow Chemical Co., all of Midland, Mich.

Device for processing soap. No. 2,092,047. Knute Bolsoe and Harry Stone, said Bolsoe assignor to Maurice B. Sawyer, all of Chicago, Ill.

Improved method joining surfaces; applying cellulose derivative adhesive, later applying a completely volatile liquid activator. No. 2,092,050. Percy Morgan Clark, Parlin, and Thos. T. Taylor, New Brunswick, N. J., to du Pont, Wilmington, Del.

Improved method of joining surfaces; applying cellulose derivative adhesive to at least one surface, using later an activator. No. 2,092,084. Earle C. Pitman, Lincroft, N. J., to du Pont, Wilmington, Del.

Combined fertilizer and soil conditioner, comprising comminuted redwood bark reacted with ammonia under heat and pressure. No. 2,092,100. Dean D. Waynick, Anaheim, Calif., to Pacific Lumber Co., San Francisco, Calif.

Production neutral mixed fertilizer. No. 2,092,123. Oscar Kaselitz, Berlin, Germany.

Liquid soldering flux consisting of a non-corrosive rosin fluxing agent in solution in a stable, non-oxidizing lubricating oil. No. 2,092,191. Chas. A. Thomas, Dayton, O., to Standard Cap & Seal Corp., New York City.

Plastic floor covering composition, comprising chloride of magnesium, pure cellulose wadding, liquid paraffin oil, and burnt magnesite. No. 2,092,228. Carl Joel Svensson, Hedvigsborg, to Arvid Pelin, Hedvigsborg, both of Boras, Sweden.

Clear drying nitrocellulose lacquer. No. 2,092,229. Kurt Thinius, Eilenburg, Germany, to Deutsche Celluloid-Fabrik, Eilenburg in Saxony, Germany.

Manufacture semi-flat enamel composition, using carbon black dry resin, hexahydrophenol, and xylol. No. 2,092,285. Dennis A. McKinney to Ford Motor Co., both of Detroit, Mich

Moist, cakable, insecticidal product, comprising extract of pyrethrum carried by a non-volatile solvent, and an inert filler. No. 2,092,308. Chas. B. Gnadinger, Minneapolis, Minn.

Manufacture asphalt compositions containing vulcanized rubber uniformly dispersed therein. No. 2,092,332. Johan Aart Plaizier, Overschie, and Jean Gerard Fol, The Hague, Netherlands, to Internationale Vereeniging Voor De Rubber en Andere Cultures in Nederlandsch-Indie, The Hague, Netherlands.

Insecticide and fungicide spreader; powder for addition to spray solutions to act as spreader, including rosin and casein, with lime as a filler and dispersing agent. No. 2,092,460. Frank Floyd Lindstaedt, Oakland, Calif., to Hercules Glue Co., Ltd., San Francisco, Calif.

Patents digested include issues of the "Patent Gazette," August 17 through September 7 inclusive.

New Trade Marks of the Month

REX-LUB
391,879

TRUBLU
365,599

Rainbo
383,976

P.S.
387,921

Dairy Calgonite
390,687

MEDALLION
392,811

SILK E DIP
374,497

Speed-
386,121

Hand Calgonite
390,688

Double Eagle
393,805

387,923

NEVILLAC
390,795

SERO-TUNG
393,091

SEE-TOO FORMULA
379,456

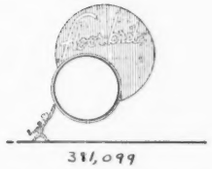
Mikrokoll
387,026

NEVILLITE
390,796

furfluf
387,944

NEVINOL
390,797

SPOTLESS
394,513


381,099

Tytrovon
387,027

"TEN-COVER"
389,655

NEVOIL
390,798

SILVERHIDE
394,685

Pentazikon
387,028

NUSHENE
381,234

Hoff's WHITE
390,452

NUBA
390,799

WHITE WONDER
353,396

CRYSTAL BAY
389,647

Pergluton
387,029

P. H. O.
390,801

391,879. National Oil Co., Inc., Richmond, Va.; Apr. 26, '37; lubricating oil; use since Oct., '31.

392,811. New York Lubricating Oil Co., New York City; May 15, '37; motor lubricating oils; use since Apr. 16, '37.

393,805. Goodyear Tire & Rubber Co., Akron, O.; June 8, '37; gasoline, lubricating and fuel oils and greases; use since July 5, '29.

393,091. Sears, Roebuck & Co., Chicago, Ill.; May 21, '37; paints, enamels, varnishes, and paint oils; use since Mar. 26, '36.

394,513. Spotless Co., Inc., Richmond, Va.; June 25, '37; paints, leads, and wood stains; use since April, '17.

394,685. Tung Oil Paint Mfg. Co., Orangeburg, N. Y.; June 29, '37; aluminum paint; use since May, '27.

353,396. John Hanser, Jr. (John Hanser Soap Co.), Milwaukee, Wis.; June 30, '34; soap flakes; use since '19.

365,599. Carman & Co., Inc., New York City; May 31, '35; bluing; use since May 1, '34.

374,497. John A. Tessmer (General Chemical Co.), Worcester, Mass.; Feb. 4, 1936; washing and cleaning preparation for fabrics; use since Jan. 26, '35.

379,456. Harold G. Valentine (H. G. Valentine Co.), Randolph, Mass.; June 8, '36; wax polishes and polishing preparations possessing cleaning properties, for automobiles, furniture, etc.; use since May 1, '36.

381,099. Chas. W. Berg (Chas. W. Berg Labs.), Phila., Pa.; July 14, '36; floor polishing liquid wax; use since Oct. 11, '35.

381,234. Speare Supply Co., Chicago, Ill.; July 20, '36; laundry detergents; use since Nov. 16, '35.

389,647. Minnesota Mining & Mfg. Co., St. Paul, Minn.; Mar. 4, '37; abrasive cloth and paper; use since '05.

383,976. Goldie Barnes (Barnes Labs.), Harvey, Ill.; Oct. 5, '36; for tinting starch; use since Mar. 1, '35.

386,121. Midway Chemical Co., Chicago, Ill., assignor to Midway Chemical Co., Jersey City, N. J.; Nov. 30, '36; metal polish; use since Nov. 30, '32.

387,026. Chemische Fabrik R. Baumheier, Aktiengesellschaft, Oschatz-Zschollau, Germany; Dec. 22, '36; technical emulsions for sizing, finishing and waterproofing paper and fabrics; use since Mar. 21, '31.

387,027. Chemische Fabrik R. Baumheier, Aktiengesellschaft, Oschatz-Zschollau, Germany; Dec. 22, '36; textile dyeing auxiliaries and finishing agents; use since Feb. 10, '25.

387,028. Chemische Fabrik R. Baumheier, Aktiengesellschaft, Oschatz-Zschollau, Germany; Dec. 22, '36; textile dyeing auxiliaries and finishing agents; use since Aug. 3, '29.

387,029. Chemische Fabrik R. Baumheier, Aktiengesellschaft, Oschatz-Zschollau, Germany; Dec. 22, '36; textile dyeing auxiliaries and finishing agents; use since April 13, '27.

387,921. Puritan Soap Co., Rochester, N. Y.; Jan. 18, '37; automobile cleaning compound; use since Jan. 30, '35.

387,923. Puritan Soap Co., Rochester, N. Y.; Jan. 18, '37; automobile cleaning and valve grinding compound; use since Jan. 30, '35.

387,944. Jenny Jacobs, New York City; Jan. 19, '37; chemical fur cleaning powder; use since Oct. 1, '36.

389,655. Minnesota Mining & Mfg. Co., St. Paul, Minn.; Mar. 4, '37; abrasive cloth and paper; use since June, '32.

390,452. John J. Hoff, New York City; Mar. 24, '37; ready mixed paints; use since Jan. 1, '28.

390,687. Calgon, Inc., Pittsburgh, Pa.; Mar. 30, '37; dairy detergents; use since Feb. 27, '37.

390,688. Calgon, Inc., Pittsburgh, Pa.; Mar. 30, '37; detergent for articles washed by hand; use since Oct. 20, '36.

390,795. Neville Co., Neville Island, Pa.; Apr. 1, '37; thermoplastic, alcohol-soluble phenol-indene-coumarone resin of graded melting point and color; use since Dec. 1, '35.

390,796. Neville Co., Neville Island, Pa.; Apr. 1, '37; white, light stable resin; use since Oct. 1, '36.

390,797. Neville Co., Neville Island, Pa.; Apr. 1, '37; pale, mild-colored viscous oil which is a plasticizing and solubilizing agent; use since June 1, '35.

390,798. Neville Co., Neville Island, Pa.; Apr. 1, '37; dark, semi-viscous oil which is useful in compounding rubber; use since Oct. 1, '30.

390,799. Neville Co., Neville Island, Pa.; Apr. 1, '37; dark brown, pitchy resin, primarily a plastic when heated, but used in dark paints also; use since June 1, '36.

390,801. Neville Co., Neville Island, Pa.; Apr. 1, '37; plasticizing oil having phenolic content, having high solvent and plasticizing capacity for cellulose acetate; use since Dec. 1, '35.

† Trade-marks reproduced and described cover those appearing in the *U. S. Patent Gazettes*, middle week August 10 to middle week Sept. 14.

392,362. Hercules Powder Co., Wilmington, Del.; May 6, '37; rosin soap; use since Apr. 14, '37.

392,457. Clifton Thomas Spear (Diamond Spear Co.), Texarkana, Tex.; May 7, '37; radiator stop leak; use since Dec., '28.

390,802. Neville Co., Neville Island, Pa.; Apr. 1, '37; modified coumarone-indene type resin; use since Apr. 1, '29.

390,803. Neville Co., Neville Island, Pa.; Apr. 1, '37; naphtha sold as paint and varnish solvent; use since July 1, '27.

390,935. Neville Co., Neville Island, Pa.; Apr. 3, '37; high melting thermoplastic resin of coumarone-indene type; use since July 1, '29.

391,001. Benj. Foster Co., Phila., Pa.; Apr. 6, '37; asphaltic and bituminous compounds and refractory cements; use since Mar. 8, '30.

391,210. Asa E. Fletcher (D-Flo Chemical Co.), Omaha, Nebr.; Apr. 12, '37; preparation for preserving animal trophies; use since Feb. 1, '35.

391,301. American Soil Sponge Selling Corp., New York City; Apr. 14, '37; peat products and all kinds of soil fillers and conditioners; use since Mar. 30, '27.

392,131. Buckeye Soda Co., Painesville, O.; May 1, '37; baking soda; use since Oct. 21, '29.

392,397. Tannade Co., Chicago, Ill.; May 6, '37; leather filler in nature of viscous solution; use since Mar. 3, '37.

392,487. General Dyestuff Corp., New York City; May 8, '37; rayon size and finish; use since June 10, '36.

392,538. Chas. D. Jordan (C. D. Jordan Lab.), Monticello, Ga.; May 10, '37; animal insect powder; use since Mar., '36.

392,555. Ridge Tool Co., No. Ridgeville, O.; May 10, '37; insecticides and fungicides; use since May 1, '37.

392,828. M. W. Kellogg Co., Jersey City, N. J., and New York City; May 15, '37; plastic chrome refractory material; use since Mar. 31, '37.

393,356. L. J. Sauerborn, Milwaukee, Wis.; May 26, '37; wax preparation which cleans and polishes automobiles in one operation; use since Aug. 1, '32.

393,076. Hercules Powder Co., Wilmington, Del.; May 21, '37; textile finishing agent; use since May 7, '37.

393,360. Atlas Supply Co., Newark, N. J.; May 28, '37; white rubber tire adhesive; use since May 11, '37.

393,678. Chas. Taylor Sons Co., Cincinnati, O.; June 4, '37; refractory material; use since May 22, '37.

393,772. Liquid Carbonic Corp., Chicago, Ill.; June 7, '37; dry ice; use since Aug. 19, '34.

393,804. Fuld Bros., Balto., Md.; June 8, '37; deodorant materials; use since Sept., '35.

393,862. Masters Builders Co., Cleveland, O.; June 9, '37; ingredient for cement, plaster, stucco, etc., increase hardness, density and resistance to disintegration, and render same more waterproof; use since Mar. 22, '37.

393,904. Harold H. Fries (Fries Bros.), New York City; June 10, '37; chemicals for photographic developers; use since Oct. 6, '36.

393,865. Minnesota Mining & Mfg. Co., St. Paul, Minn.; June 9, '37; adhesives, adhesive tape, sheet and fabrics, cement, elastic-weather-strip- and rubber cement; use since Nov. 18, '31.

393,915. Wm. S. Merrell Co., Reading, O.; June 10, '37; fluid disinfectant, germicide, and antiseptic; use since May 25, '37.

393,922. Standard Oil Development Co., Linden, N. J.; June 10, '37; dye for oils; use since May 6, '37.

393,948. Dye-Col Products, Inc., New York City; June 11, '37; horticultural insecticides; use since June 1, '37.

393,952. International Lubricant Corp., New Orleans, La.; June 11, '37; lubricating oils and greases; use since June 1, '35.

393,953. International Lubricant Corp., New Orleans, La.; June 11, '37; lubricating oils and greases; use since June 1, '35.

393,956. International Lubricant Corp., New Orleans, La.; June 11, '37; lubricating oils and greases; use since June 1, '35.

393,955. International Lubricant Corp., New Orleans, La.; June 11, '37; petroleum lubricating oils and greases; use since June 1, '35.

393,963. Simonds Worden White Co., Dayton, O.; June 11, '37; abrasive grinding wheels; use since Mar. 1, '37.

393,965. Universal Atlas Cement Co., Chicago, Ill.; June 11, '37; oil well cement; use since Oct. 5, '36.

394,181. National-Boston Lead Co., Boston, Mass.; June 17, '37; white lead, dry or ground in oil; use since 1847.

394,231. Hickok Oil Corp., Toledo, O.; June 18, '37; fuel oils and lubricating oils and greases; use since June 8, '37.

394,230. Hickok Oil Corp., Toledo, O.; June 18, '37; fuel oils and lubricating oils and greases; use since June 8, '37.

Use of sodium zincate in combination with an aromatic hydrocarbon has been proposed for the control of grasshoppers, according to a British patent granted to an important Argentine chemical manufacturing company.

STARKIE INSULATED TANK CAR SERVICE

to take care of the ever increasing demands for Starkie products and to assist our users to simplify unloading and handling at their plants.

Starkie's Pure Binders are produced from a Pure Vegetable Base. Available in melting points from 65/200° F.

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394,272

CLEAR O ZYME
393,413

VEL
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IMMAC
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"FREEZFREEH"
394,522

AIRMITE
395,197

RAYSIL
395,531

381,406

KLENZENE
394,739

LIGNOCOL
395,665

VICTOR
394,419

394,793

GRITCRETE
395,256

JOHN T. LEWIS & BROS
395,675

394,814

LUTRALITE
394,482

VAPOLITH
395,260

MONOGRAM
395,678

MOR-DEX
385,936

K&K
394,841

KATOZYME
394,476

THERMALUM
395,314

Acykal
392,043

384,748

394,234. Kraft Products Co., Altoona, Pa.; June 18, '37; cleaning compounds; use since Mar. 1, '34.

394,272. Ellis Verner Day (Saoso Chemical Co.), Dallas, Tex.; June 19, '37; water softener and soap saver; use since May 21, '37.

394,399. Colgate-Palmolive-Peet Co., Jersey City, N. J.; June 23, '37; detergent; use since June 15, '37.

394,400. Colgate-Palmolive-Peet Co., Jersey City, N. J.; June 23, '37; detergent; use since June 15, '37.

394,419. Mid-States Gummed Paper Co., Chicago, Ill.; June 23, '37; gummed cloth tape; use since June 1, '37.

394,482. Foster Grant & Co., Inc., Leominster, Mass.; June 25, '37; plastic material of vinyl acetate base for use in manufacture molded products; use since Jan. 19, '37.

394,476. Takamine Laboratory, Inc., Clifton, N. J.; June 24, '37; powdered preparation for desizing textiles; use since June 1, '32.

394,457. General Oil Burner Corp., Balto., Md.; June 24, '37; thermal insulation material; use since May, '35.

394,501. Mystic Labs., Inc., Jersey City, N. J.; June 25, '37; deodorant; use since May 12, '37.

394,522. W. H. Barber Co., Chicago, Ill.; June 26, '37; anti-freeze solution; use since Sept. 13, '35.

394,739. Bennett Glass & Paint Co., Salt Lake City, Utah; July 1, '37; absorptive dough-like preparation for cleaning wall paper; use since Mar. 1, '19.

394,793. Julius Macsata (Diamond Automotive Products Co.), Torrington, Conn.; July 2, '37; anti-rust compound for automobile radiators, radiator cleaners, radiator stop-leak, and anti-freeze; use since May 18, '37.

394,841. Kenite Laboratory, Inc., New York City; July 3, '37; boiler cleaner and steam conditioner; use since June 29, '37.

394,863. Sandoz Chemical Works, Inc., New York City; July 3, '37; dyestuffs; use since June 2, '37.

394,901. Industrial Lubricants Co., Detroit, Mich.; July 6, '37; polishing-wheel cement; use since Jan., '35.

395,030. Benj. Foster Co., Phila., Pa.; July 9, '37; asphaltic and bituminous compounds; use since May 11, '34.

395,197. Don B. McCloud, Duquoin, Ill.; July 14, '37; explosives; use June 28, '37.

395,256. Aerocrete Corp. of America, New York City; July 16, '37; cement ingredient for use in expanding same into porous concrete; use since May 18, '37.

395,260. Ault & Wiborg Corp., Cincinnati, O., and New York City; July 16, '37; printing inks; use since June 18, '37.

395,314. Benj. Moore & Co., Jersey City, N. J., and New York City; July 16, '37; ready mixed paint and paint enamels; use since Nov. 4, '36.

395,324. U. S. Gypsum Co., Chicago, Ill.; July 16, '37; insulation board; use since Jan., '37.

395,346. Wm. E. Hooper & Sons Co., Balto., Md.; July 17, '37; waterproof, mildew resisting material; use since Apr. 1, '29.

395,350. Maureen Chemical Co., Seattle, Wash.; July 17, '37; slug and snail destroyer; use since July 1, '37.

395,531. Krebs Pigment & Color Corp., Wilmington, Del.; July 22, '37; paint pigments; use since May 26, '36.

395,665. Heyden Chemical Corp., New York City; July 27, '37; liquid compounds or mixtures used as anti-oxidant or anti-skinner in paint, lacquer and varnish industries; use since May 8, '30.

395,675. John T. Lewis & Bros. Co., Phila., Pa.; July 27, '37; white lead, oxide of lead, white zinc, pigment colors, colored paints, and linseed oil; use since 1860.

395,678. John T. Lewis & Bros. Co., Phila., Pa.; July 27, '37; solder and anti-friction metal alloys; use since Dec. 9, '10.

392,043. Merz & Co., Chemische Fabrik, Frankfort-am-Main, Germany; Apr. 29, '37; antiseptic and bacterial agents, insecticides and disinfectants; use since Dec. 10, '36.

394,938. General Chemical Co., New York City; July 7, '37; detergents; use since Dec. 16, '36.

393,413. Chill Foam Corp. of America, Detroit, Mich.; May 29, '37; chemical powder used to chillproof beer; use since Apr. 21, '37.

381,406. Dow Chemical Co., Midland, Mich.; July 24, '36; horticultural spray or dust; use since Feb. 25, '36.

394,814. Sure-Grip Adhesives, Inc., Albany, N. Y.; July 2, '37; adhesives; use since Jan. 1, '23.

385,936. Nulomoline Co., New York City; Nov. 24, '36; plasticizer for glue, paper, and leather industries; use since Aug. 26, '36.

384,748. Geo. E. Hitz, Poughkeepsie, N. Y.; Oct. 24, '36; frost preventive, anti-freeze solution, etc.; use since Mar. 15, '36.

Under decree recently issued by the Association of the German Grain Trade all cooperatives and other joint organizations maintaining establishments for cleaning and disinfecting grain seed are required to make their facilities available to non-members for treating their seed, against suitable compensation.

CHEMICAL NEWS & MARKETS

Chester F. Hockley, who has brought reorganized Davison into the black

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LABOR TROUBLES CONTINUE

A. F. L. Charges Calco with Favoritism—Reilly Tar Signs with Mine Workers Affiliate—Other Strikes Settled—

Labor troubles still beset several chemical companies, yet the problem has not reached an acute stage such as developed in the steel, automotive, and textile industries. Chemical wage scales generally are high when compared to most other industries. The percentage of skilled labor employed is also generally higher. A large proportion of the current difficulties have arisen with plant carpenters, mechanics, longshoremen, maintenance crews, etc., not with the actual operating forces.

In a hearing held at Somerville, N. J., before trial examiner, Charles E. Persons, Calco Co. officials entered a general denial of the various charges brought before the NLRB by the Chemical Workers Local Union, an A. F. of L. affiliate.

Attorney George R. Martin, Calco secretary, upon completion of testimony by the A. F. of L. workers, made a series of motions which the trial examiner took under advisement.

Martin asked that charges as to Cyanamid be dismissed inasmuch as no direct evidence had been presented that the company was in any way responsible for the alleged actions of the Calco Co.

Attorney Martin in other motions asked dismissal of charges that Calco had laid off or transferred certain employes because of labor union activities and that either company had taken any action favoring either Calcocraft, an independent vertical union, or the Chemical Workers Local Union, an affiliate of the A. F. of L., or that either company had been antagonistic to either union.

All of these charges were brought by the NLRB on complaint of the Chemical Workers Local Union. Another charge alleges that the company has fostered, sponsored and assisted Calcocraft in its organization and efforts to become the bargaining unit for Calco employes.

Calcocraft asked to be joined in the case as a respondent, through its attorney, Edward W. Hamilton of Buffalo, N. Y., under whose copyrighted plan the union was organized.

During a four-hour session on the witness stand, F. M. Taylor, vice-president and general manager of Calco, denied that the company had obtained gas bombs and hired armed guards to protect its plant against strikers, as charged in the petition before the National Labor Relations Board.

Mr. Taylor, who was examined in the early part of the hearing, was recalled to the witness stand by Lester Levin, counsel for the Labor Board, after George R. Martin, counsel for the Calco, announced that Mr. Taylor would be forced to depart on an urgent business trip in Europe. He asked that any further evidence required should be heard before that time, so that there could be no complaint that he had gone abroad to escape further examination.

The executive testified that after organizers of the A. F. of L. and Calcocraft had "got rather red-headed" over soliciting membership in the plant during working hours, he had given E. J. Dempsey, plant works manager, explicit orders to stop it, and to show no favoritism to either union.

Mr. Taylor said he knew of no discharge or lay-off for union affiliation, except in one or two flagrant cases, where they had defiantly disobeyed the order to stop solicitation during working hours.

Several strikes have been brought to an end in the past month and several bargaining agreements concluded. Reilly Tar & Chemical has signed with the workers at the Fairmount, W. Va., plant through a contract with District No. 50, United Mine Workers, calling for an immediate wage increase of 5c per hour, another increase on Jan. 1st, and exclusive bargaining rights for the entire plant.

The 11-day strike of longshoremen at Armour Fertilizer's plant at Searsport, Me., was brought to an end on Sept. 20th with the granting of wage increases. City officials at Gibbsboro, N. J., have petitioned John Lucas & Co. to reopen its plant which has been closed since May 13th because of labor troubles. Archer-Daniels-Midland has granted wage increases up to 15% to all employes in the production departments of its plant in Edgewater, N. J. Employes have an independent organization.

Monsanto Sells to T. V. A.

Sintered phosphatic materials, processed in Monsanto's plant in Maury County, Tenn., will be supplied the T. V. A., according to a recently awarded contract. The Company will mine from T. V. A. property near the plant. Muck thus obtained will be sintered and the plate rock and sand shipped to the Authority at Muscle Shoals.

Use of the Monsanto plant makes unnecessary the building of sintering facilities by the T. V. A. This sinter, together with other fine phosphatic materials agglomerated at Muscle Shoals, is to be used by the Authority in its experimental production of plant foods. The contract is for 5 years, beginning July 1, '37.

Clarence L. Dunn has resigned from du Pont's rayon division to become a research chemist for Shell Development Emeryville, Calif.

May Close Natrona Plant

Pennsylvania Salt is considering removal of operations from its Natrona, Western Pennsylvania plant, it was revealed by Leonard T. Beale, president of the concern, who recently returned from a European business and vacation trip.

Explaining the Natrona plant has been idle since July 30th because of a strike, its first in 50 years, Beale pointed out a considerable saving could be effected by the transfer of operations to other plants and the abandonment of certain processes that are proving unprofitable.

Because raw materials used at Natrona come largely by way of the Atlantic seaboard, he said, a saving in freight charges could be realized by establishing these operations at more advantageous points. Cost of carrying out this plan would be relatively small, he said.

Giving Kryolith as a specific example, he declared raw ore for this product has been imported from Greenland in large quantities since 1865. Originally this ore was of a high degree of purity, but in recent years the shipment of ore of lesser purity has added greatly to the total freight expense. This, said Beale, indicated material savings if the production were established at a more advantageous point. He said the same is true of other raw materials such as Bauxite.

"For many years," Beale said, "the company has been aware of this situation, but has hesitated to consider any plan that would mean the ultimate abandonment of its oldest plant and the releasing of loyal employes who have been on its payroll for many years.

"The present serious labor conditions at Natrona, however, have brought this problem up for immediate consideration, and a study leading to the transfer of production of other plants is now in progress."

Discussing his European tour, he compared what he termed "the satisfactory relationship between industry and labor that exists in England, where labor has assumed its share of responsibility and is controlled by able leadership, with the highly unsatisfactory conditions existing today in this country."

Twenty of the 75 chemical companies in the First Chemical Section Safety Contest, sponsored by the National Safety Council, finished the 6 months' period from January 1st to June 30th without a single disabling injury.

The N. Y. Professional Chapter of Alpha Chi Sigma has elected the following for '37-8: president, Foster Dee Snell; vice-president, R. E. Horsey; secretary, E. R. Hanson; treasurer, H. N. La Croix.

Half Year's Exports Set New Records

All Chemical Products, Except Sulfur and Fertilizers, in Greater Foreign Demand—Specialty Sales Booming—

U. S. exports of chemicals and related products gained almost 20% during the first half of the current year reaching a level only 15% below that recorded in the corresponding period of 1929. Total value during the first half of the current year was recorded at $90,000,000, against $75,600,000 in the corresponding months of '36, and was only $15,500,000 less than the record established in the first half of '29.

Compared with the first half of '36 all leading items on the list, with the exception of sulfur and fertilizers, have recorded substantial gains this year. These two commodities mentioned, being bulky, were handicapped by shipping facilities.

Among the various groups, chemical specialties recorded the most outstanding gain, total during the first half of the year reaching $13,730,700, compared with $9,454,700 in the corresponding period of 1936. This group is made up of a large number of high-grade specialties, including pyroxylin products, exports of which increased in value from $1,909,000 to $2,454,500 and synthetic gums and resins the export value of which rose from $340,000 to $596,000. Exports of industrial chemicals were next on the list with shipments valued at $14,115,000 against $11,327,000 in the first 6 months of last year.

Sulfur exports, both crude and refined, declined substantially in the first half of the year, compared with the same period of '36—former from 294,750 to 257,600 tons and the latter from 16,104 to 7,901 tons.

Foreign demand for American paint products was especially active during the first half of the year, statistics show. Exports of such products reached the value of $11,206,000 during the period, compared with $8,790,000 in the first 6 months of '36. In this classification shipments of ready mixed paints, varnishes and lacquers increased from 2,126,300 to 2,608,300 gals. and the value received rose from $3,399,000 to $4,129,500.

Recorded value of naval stores exports also increased substantially in the first half of the current year to a total of $10,792,500 from $8,200,600 in the same period of 1936—the gain, however, was due largely to higher price levels, particularly for rosin. In this group exports of turpentine increased from 5,169,000 to 5,501,000 gals., but rosin shipments declined from 577,700 to 481,700 bbls.

Other items on the chemical and related products export list recording gains in the first half of the year, compared with the same period of 1936 included essential oils, the value of which rose from $1,168,000 to $1,468,000; coal-tar products, from $7,425,300 to $8,013,000; medicinals, from $6,768,000 to $8,787,000; industrial explosives, from $1,187,000 to $1,968,000; soap from $1,238,000 to $1,656,000; and printing and lithographing inks from $477,000 to $562,650.

Exports of fertilizers were also lower during the first half of the current year. Shipments of such products to foreign countries during the period declined to 635,078 tons valued at $7,035,000 from 857,526 tons valued at $9,801,550 in the first half of '36.

Chemical export outlook for the balance of the year is said to be especially good. World purchasing power is increasing rapidly, particularly in South America and in other agricultural regions due to better prices for foodstuffs and agricultural products generally, and in industrial nations where manufacturing activity is gradually reducing unemployment.

Although the beginnings of a domestic chemical industry have been made in China and considerable progress has been recorded in certain directions, the area is still preeminently an import chemical field, according to a report by American Trade Commissioner A. Viola Smith, Shanghai. Last year China bought imported chemicals and related products valued at approximately $31,000,000 U. S. currency, with Germany supplying 40%; U. S., 14; Japan, 16; Great Britain, 12%.

COMING EVENTS

Drug Trades Exposition and Fall Convention, Grand Central Palace, N. Y., Oct. 10-13.
National Safety Council, Kansas City, Mo., Oct. 11-15.
American Gas Association, annual meeting, Oct. 11-16.
Pa. Water Works Association, annual meeting, Atlantic City, Haddon Hall, Oct. 13-15.
Porcelain Enamel Institute, Ohio State University, Columbus, Ohio, Oct. 13-15.
The Electrochemical Society, annual meeting, Hotel Chase, St. Louis, Mo., Oct. 13-16.
American Oil Chemists Society, fall convention, Oct. 14-15, Hotel LaSalle, Chicago.
Technical Ass'n Pulp & Paper Industry, Fall Convention, De Soto Hotel, Savannah, Ga., October 18-20.
American Society for Metals, Congress and Exposition, Atlantic City Auditorium, Atlantic City, Oct. 18-21.
National Pest Control Association, annual meeting, Memphis, Oct. 25-27.
N. P. V. & L. A., Convention, Cincinnati, Ohio, Oct. 27-29.
Association of Official Agricultural Chemists, Washington, Nov. 1-3.
Ohio Ceramic Industries Association, annual meeting, Columbus, Nov. 5-6.
National Fertilizer Association, Biltmore Hotel, Atlanta, Ga., Nov. 8-10.
International Acetylene Association, Birmingham, Nov. 10-12.
A. C. S. Ohio-Michigan Regional Meeting, Columbus, Ohio, Nov. 19-20.
American Association of Textile Chemists & Colorists, annual meeting, Bellevue-Stratford Hotel, Philadelphia, Dec. 3-4.
National Association of Insecticide & Disinfectant Manufacturers, Semi-Annual Conventon, Hotel Biltmore, N. Y. City, Dec. 6-7.
Exposition of Chemical Industries, Grand Central Palace, N. Y. City, Dec. 6-11.
Second Annual Symposium, Division of Physical & Inorganic Chemistry, Cleveland, Dec. 27-29.
Seventh National Organic Chemistry Symposium, Division of Organic Chemistry, Richmond, Va., Dec. 28-30.
National Association of Dyers and Cleaners, Hotel Stevens, Chicago, Jan. 17-20, 1938.
Fifth International Heating & Ventilating Exposition, Grand Central Palace, New York City, Jan. 24-28, 1938.
American Ceramic Society, 40th Annual meeting, New Orleans, March 27-April 2, '38.
A. C. S., 95th Meeting, Dallas, Apr. 18-21, '38.
International Petroleum Exposition, Tulsa, Okla., May 14-21, '38.

LOCAL TO NEW YORK

North Jersey Section, A. C. S., Oct. 11th, Hotel Winfield Scott, Elizabeth, N. J.
Presentation of the Chandler Medal, Oct. 27th, Columbia University.
Chandler Centennial Dinner, Nov. 4th, Waldorf-Astoria.

Hercules Opens in England

It was announced Sept. 17th by Hercules Powder that a new company has been formed in England, in conjunction with the Bleachers' Association, Ltd., of Manchester, for the manufacture of chemical cotton. Association of the two companies on this project provides consuming industries in England with a larger source of chemical cotton than had previously been available. The extensive experience of the Bleachers' Association in the textile and other industries, coupled with Hercules' knowledge of cellulose chemistry, will enable the new plant to produce quality products.

A modern plant of latest design for producing these high qualities of cellulose from cotton linters is being built under the supervision of Hercules' engineers. Hercules is supplying the technical information on the process. Production of the new plant will be used by manufacturers of lacquers, Celluloid, cellulose acetate, and for other associated purposes.

New company will be known as Holden Vale Manufacturing Co., and takes its name from the section in which it is located. This is about 18 miles north of Manchester.

Otaki Natural Gas Co. is reported to have formed a subsidiary, Tennen Gas Kagaku K. K. (Natural Gas Chemical Industry Co., Ltd.), with an authorized capital of 500,000 yen, of which one-half is fully paid. New company intends to recover iodine from subterranean brine, which occurs in the natural gas area of Otaki and vicinity (Chiba Prefecture). Company will utilize a process developed by the Physical and Chemical Research Institute.

Bradley Dewey, president, Dewey and Almy Chemical, has been elected a life member of the governing board of the M. I. T. He is a graduate of the class of '09.

Dr. Wilder D. Bancroft and A. Cressy Morrison have been elected honorary members of the American Institute of Chemists.

Westinghouse's New Department

Responsibility for the development of lines of activity which either are new in the art or which have not been previously undertaken by the company has been centralized by Westinghouse Electric & Manufacturing with the formation of a new products division. Functioning the same as the other operating units of the company, this division will include separate engineering, manufacturing and sales departments.

In its new capacity the division will concentrate its facilities for developing and broadening the field of applications of products which have not reached the state of commercial apparatus.

H. M. Wilcox is manager of the new products division with H. W. Tenney as engineering manager and George F. Begoon as sales manager. The latter was associated with National Aniline from '29 to '37.

Dr. A. A. Bates recently joined the staff of the Westinghouse Research Laboratories as manager of the chemical and metallurgical division. Dr. Bates was formerly professor of metallurgy at Case and served as consultant for a number of companies in the Cleveland area. Previously, he had been employed by National Tube and was also research metallurgist for National Malleable and Steel Casting.

"Abstracts" Editor Honored

The Chemical Industry Medal Committee has elected E. J. Crane, Editor of *Chemical Abstracts*, to receive the Chemical Industry Medal for 1937.

This medal is awarded annually to a person making a valuable application of

chemical research to industry. The medallist is elected by the Medal Committee, the Executive Committee of the American Section of the Society of Chemical Industry.

Medal will be presented on Nov. 5th, 1937, at a meeting to be held at The Chemists' Club.

Board of Trade Picnic

The 2nd fall meeting of the Drug, Chemical and Allied Trades Section of the N. Y. Board of Trade, held at Shawnee-on-Delaware, Pa., Sept. 17th and 18th, proved to be a gala attraction for a large number of executives in the drug and chemical fields. Chairman of the section, Joseph A. Huisking, in welcoming the guests stated that the section's annual dinner had grown to such prominence nationally that it was felt that a second affair, less formal and providing ample opportunity for the members to become better acquainted, was a necessity.

Speakers included Dr. Robert L. Swain, managing director of the Druggists' National Fair Trade Board, C. K. Moser, chief of the Far Eastern Section Division of Regional Information of the Bureau of Foreign and Domestic Commerce, a brief review of recent legislation by Carl M. Anderson of Merck, and a report on membership by George Simon of Heyden Chemical.

Winners in the golf tournament included: Low gross, Charles E. Kelly, Hagerty Brothers & Co.; first flight, low net, Paul Miller, International Cellucotton Products; second low net, C. Allers, guest of Solvay Sales; kickers, tie between J. Wrench, Industrial Chemical Sales Division of the West Virginia Pulp & Paper, and W. D. Barry, Mallinckrodt.

Second flight, low net, Joseph A. Huisking, Charles L. Huisking & Co.; second low net, Elliott Odell, Topics Publishing; kickers, tie between J. P. Remensnyder, Heyden, and Ralph E. Dorland, Dow.

Third flight, low net, J. V. Stauf, Solvay Sales; second low net, W. C. Adams, Polygraphic Co. of America. Honest score, Carl M. Anderson, Merck.

New Chemical Plants

Large additions to manufacturing operations are planned by many industrial chemical companies. Freeport Sulphur announces that it will proceed at once with a $300,000 construction program at its Port Sulphur mines in Louisiana; Southern Alkali is said to be ready to start a $10,000,000 chlorine plant at Corpus Christi; Virginia-Carolina Chemical has placed a contract with Leonard Construction for a $200,000 sulfuric acid plant at Birmingham; Mountain Copper will erect a slime plant near Matheson, Calif.; the C. A. Kearney Co., Seattle, Wash., producer of epsom salt, has purchased 12-acre Epso Lake and moved its headquarters to Tonasket; Hooker is planning a $40,000 addition to its plant and laboratory at Niagara Falls; Diamond Alkali has purchased additional property adjacent to the Jersey City plant of its subsidiary, Standard Silicate.

Allison Bishopric, Sr., president of the Bishopric Products Co. and Natural Sodium Products, Ltd., Cincinnati, was killed Aug. 31st when his car collided with a bus while he was driving to Michigan to celebrate his 66th birthday.

Dr. W. N. Stull Dies

Dr. Wilfred N. Stull, 61, Mallinckrodt vice-president in charge of operations and research, died on Sept. 17th of a heart attack complicated with pneumonia. He had gone to Brunswick, Me., in an endeavor to recover his health. His family and A. C. Boylston, general manager of the company, were with him when he died.

Dr. Stull was born at Elizabeth, Iowa, Dec. 1, 1877, the son of a country doctor. He attended local schools and also the

University of Iowa, where he took his B.S. in 1898 and his M.S. in 1899. He then went to Harvard and studied chemistry under Theodore William Richards, and took his Ph.D. there in physical chemistry in 1903. He joined Mallinckrodt almost immediately, and, except for a short interval, had been with the company ever since. He was first research chemist in St. Louis, and then for some years was in charge of the company's Jersey City plant, where he installed modern methods and many new processes. In 1911 he was called back to the St. Louis plant and put in charge of all operations at the home plant as well as the Jersey City plant, and since that time had acted as chemical director in charge of operations and research. In '22 he was made a director of the corporation, and several years later was elected a vice-president.

Noak Victor Hybinette, 70, internationally known chemical engineer and metallurgist, died Sept. 7th at Merano, Italy, where he had gone in an effort to regain his health. For many years he was a consultant for International Nickel and in '31 founded the Nicralumin Corp. He made his home at Jackson, Mich.

A Correction

Mathieson Alkali Works, Inc., has informed us that the caption with reference to their Lake Charles operation, appearing on page 233 of our September issue, is incorrect. They have no crushing or grinding equipment or any other equipment for breaking down shells. These are burned as dredged.

Heavy Chemicals

Important Price Changes

	Sept. 30	Aug. 31
ADVANCED		
Acid gallic	$ 0.75	$ 0.65
Acid tannic	.40	.30
Acid pyrogallic	1.05	.90
Antimony	.15¾	.15⅜
Antimony needle	.14	.13
DECLINED		
Acid acetic 28%	$ 2.70*	$ 2.78
Calcium acetate	1.95	2.25
Copper	.12	.14
Copper sulfate	5.00†	5.15
Lead, E. St. Louis	5.85	6.35
Sodium stannate	.36	.37½
Tin	.55⅝	.58⅜
Tin tetrachloride	.28¼	.29½
Zinc	6.50	7.25

* Based on $2.15 acetate of lime price.
† Based on the 13c price for copper.

Heavy Chemical Notes

Exports of crude and refined sulfur which have been lagging in recent months, due it is said to the difficulty of securing bottoms, recovered somewhat in July during which shipments aggregated 73,422 tons valued at $1,121,600 against 56,290 tons valued at $1,151,000 in June and 37,527 tons valued at $696,000 in July, '36.

Phillip J. LaBlue has joined the Joseph Turner organization and will be located at the main office at Ridgefield, N. J. He was with Powers-Weightman-Rosengarten from '17 to '27 when it merged with Merck. He remained with the latter firm until '29 when he went with J. T. Baker Chemical and became manager of the N. Y. City office.

Edwin H. Arnold, son of a founder of Arnold-Hoffman, has been elected first vice-president and treasurer to succeed the late Edward M. Johnson. Mr. Arnold was in the utility field until his recent election to an executive position with Arnold-Hoffman.

Monsanto Chemical announces that Thornton Jesdale has been made assistant manager of its Chicago District Sales Office to succeed M. V. Pennal who has resigned. Mr. Jesdale has been associated with Monsanto's Chicago office for several years.

A record was established in '36 for imports of sodium silicofluoride with receipts reported at 3,262 short tons. Entries during the first half of '37 were reported at 1,326 tons. Denmark and Italy were the two largest suppliers.

Dr. Paul V. McKinney is now senior fellow on the Texas Gulf Sulphur's Mellon fellowship, taking the place of W. W. Duecker who is now at the company's N. Y. City headquarters.

Fall Demand from Industries Lags

Industrial Activity Spotty and Chemical Sales Not Up to 1936—Metals and Acetate Lower—

The traditionally expected pickup in manufacturing activity following the Labor Day period failed to materialize in September. From this it should not be construed that production levels are abnormally low. In most lines a fairly satisfactory pace is being maintained, but so far industry has not returned to conditions similar to those prevailing last spring. Movement of industrial chemicals was spotty in the past 30 days indicating a continuance of "Hand-to-mouth" buying policies and a desire to work off inventories. With the stock market and commodity prices taking a succession of "nose-dives" little incentive exists for building up surpluses at the moment in contrast to exactly the opposite situation which prevailed last fall when purchasing agents frantically stocked against a wave of soaring prices.

Mixed conditions prevail in the principal chemical consuming industries. Automotive production reached a low for the year in September with manufacturers tooling for '38 models. October total is expected to top the corresponding month of '36 principally because the N. Y. formal opening takes place sooner, producers want dealers well stocked before announcing the new cars, and fewer basic changes are being made.

Rayon production remains close to plant capacity. Cotton mills have reduced operations markedly from the high rates prevailing last spring and further downward readjustment will be effected in October. August cotton consumption totalled 604,380 bales, as compared with 583,066 in July, and 575,014 in August a year ago. Deliveries of silk in August totalled 33,557 bales, as compared with 31,399 bales in July and August '36 deliveries of 42,016. Labor troubles are still troublesome in the dyeing and finishing centers, but a sharp pickup is already under way on late fall and winter goods and in some instances on materials for spring delivery. An unfavorable outlook is reported by the woolen mills.

Sales of the major rubber products in the months ahead are expected to be about equal to the level of the same period a year ago. The trend in new car output, because of its influence on rubber consumption, will largely determine whether there is a net gain or loss. Domestic crude rubber consumption in August (41,456 tons) was slightly above trade expectations, but remained below a year ago for the second consecutive month. September figure may have reached the 46,000 ton figure of September of last year principally because of the earlier date for the automobile show. It is not expected, however, that the industry will regain the 52,000 ton monthly average rate attained last spring, and it is doubtful that consumption will reach 600,000 tons for the year. It will show an increase over the 573,000 tons of last year, an all-time record.

The paper industry has lost a bit of its earlier optimism, but production over the balance of the year may equal that for the corresponding period of last year. North American newsprint production in August of 429,543 tons was an increase of 15.2% over the same month of last year.

The glass industry is recovering from the July low point. August window glass production amounted to 1,351,948 boxes, representing 83.4% of the industry's capacity, compared with 1,320,406 boxes, or 81.3% in July. August plate glass production totalled 17,898,064 sq. ft., compared with 15,344,855 in July, and 18,710,040 in August of last year.

The copper market finally succumbed to the wave of declining commodity prices late last month and the 1c reduction caused a 25c per 100 lb. decline in copper sulfate. Producers of the latter, however, were forced to make an upward movement of 10c almost immediately because of higher labor costs and other additional factors and the item is now quoted at $5.00 in carlots. Consumption is still running heavy, and September shipments are expected to exceed that for August by 1,000,000 lbs. Spot stocks are still not plentiful.

Acetate of lime was off 15c and acetic acid prices were reduced 8 to 27c. Stocks of the former usually are large in the fall following the heavy operations during the summer. Advances in gallic and tannic acids were caused by the impossibility of obtaining adequate supplies of Chinese nutgalls. The Aleppo types are more expensive, and, it is said, in some cases the yield is not quite as good as Chinese types.

As the month closed signs of improvement are discernible. Bookings for the 4th quarter are generally satisfactory. The uncertainties over the European and Far East situations continue and the domestic political pot-pourri can hardly be classed as improving. Yet the purchasing power of the farmer is vastly improved and retail consumption is expected to furnish sufficient stimulus to clear out surpluses and lift manufacturing operations to a satisfactory fall level.

Strangely little as yet is heard in trade circles on prices for '38. Labor costs undoubtedly will be greater. Raw material costs (despite recent declines in the commodity markets) are in most instances above the corresponding period of last year. Producers and consumers alike will be watching closely every development in the next 60 days.

DIACETONE

$CH_3COCH_2C(CH_3)_2OH$

LOW PRICE WARRANTS WIDER USE

DIACETONE, of highest quality, is now available at lowest prices in history—justifying new interest in this versatile solvent.

Diacetone possesses an unusual combination of properties especially valuable in many industrial applications. It is an excellent solvent for cellulose acetate, nitrocellulose, and for many oils, fats, resins, and dyes. Its strong solvent power for cellulose acetate in combination with its slow rate of evaporation makes it particularly useful in the formation of cellulose acetate airplane dopes and lacquers. It is also useful as a component in wood preservatives and stains. It is characterized by a mild and pleasant odor.

The versatility of Diacetone is further demonstrated by its property not only of reducing the viscosities of heavy organic liquids but also of minimizing the effect of temperature on their viscosities. Upon this property is based its patented use in hydraulic compression fluids. It is also used as a component of anti-freeze solutions and as an intermediate in the manufacture of synthetic resins.

Perhaps you are engaged in some research or production operation in which Diacetone at its new low price might be used to advantage. We shall be glad to send you samples and complete technical data. Please specify whether the Acetone Free or the Technical Grade is desired.

PROPERTIES OF DIACETONE*— ACETONE FREE

Specific Gravity: 0.937 to 0.943 at 20° C./20° C.
Acidity: Not more than 0.05%, calculated as acetic acid.
Color: Water-white.
Solubility: Miscible with water and most organic solvents.
Odor: Mild, pleasant.
Flash Point: About 55° C. (131° F.).
Boiling Point: 165° C. at 760 mm. of mercury.
Melting Point: Approximately —54° C.
Vapor Pressure: 7.0 mm. of mercury at 27.5° C.

*Also available as Diacetone Technical Grade, containing not over 16% Acetone.

Technical data sheets on Diacetone and other Commercial Solvents Corporation's chemicals listed below are available. Please write on your letterhead.

Products of Commercial Solvents Corporation

Acetone
Amyl Acetate
Butalyde
Butanol
Butyl Acetate
Butyl Acetyl Ricinoleate
Butyl Lactate
Butyl Oleate
Butyl Ricinoleate
Butyl Stearate
Diacetone
Dibutyl Ether
Dibutyl Phthalate
Dibutyl Tartrate
Dimethylamine
Dimethyl Phthalate
Ethyl Acetate
Ethyl Alcohol*
(Pure and all denatured formulas)
Ethyl Formate
Mesityl Oxide
Methanol
Methyl Lactate
Monomethylamine
Shellacol*
Tributyl Citrate
Tributyl Phosphate
Triethyl Phosphate
Trimethylamine

*regular and anhydrous grades

COMMERCIAL SOLVENTS CORPORATION
NEW YORK CENTRAL BUILDING, NEW YORK, N. Y.
PROMPT SHIPMENT FROM BRANCH OFFICES AND WAREHOUSES

Coal-Tar Chemicals

Important Price Changes

ADVANCED

	Sept. 30	Aug. 31
Acid Anthranilic, ref.	$ 0.95	$ 0.85
Phenol, drums	.14½	.13¾
Tanks	.13½	.12¾

DECLINED

None.

Coal-Tar Notes

General Dyestuffs Corp., N. Y. City, has taken over a 5-story and basement building at 117-23 S. 2nd St., Philadelphia, and will remodel for warehousing, distribution, laboratory and office purposes.

General Aniline Works has let contracts for the construction of additional building and manufacturing facilities at Grasselli, N. J. These together with a new office building will cost $500,000.

The Koppers Co. has been awarded a contract by Colorado Fuel & Iron to erect a battery of 41 coke ovens at Pueblo, Colo. Becker-type ovens will be installed at a cost approximating $1,000,000 and will be completed by August of next year.

The Bureau of Customs has published supplementary list No. 52 of proposed standards of strength of imported coal-tar dyes.

A small explosion occurred at the new Malden, Mass., plant of the Barrett Co., destroying 30,000 gals. of road Tarvia.

David A. Rothrock, Jr., has resigned from Brown University to do research for Resinous Products & Chemical, Philadelphia.

Frank E. Hanson has resigned from the testing laboratory of Boston Consolidated Gas to become director of research for the American Gas Products division of American Radiator. He is located at Mt. Vernon, N. Y.

Dr. M. L. Crossley, Calco's director of research, is the new chairman of the North Jersey Section of the A.C.S.

German production of chemicals and allied products continued to surge ahead during the first half of the current year with the demand for certain lines so heavy at times that factories found it difficult to make prompt deliveries, according to a report from Consul Sydney B. Redecker, Frankfort-on-Main, made public by the Commerce Dept.'s Chemical Division.

Coal-Tar Chemicals in Brisk Demand

Phenol Price Advance was Expected—Phthalic Stocks Easier —Demand Sustained but Prices Steady—

Coal-tar chemicals were a bright spot in the chemical picture last month, contrasting quite noticeably with the general state of dullness prevailing in most of the other divisions of the industry. Domestic demand held up remarkably well, and this aided by a brisk demand for export, provided manufacturers with excellent volume for the period.

A long-expected rise in phenol was placed in effect, the increase amounting to ¾c. Producers are quoting 13½c in tanks and 14½c for drums in carloads. The continued sharp increase in the plastic field output, plus expansion of manufacturing operations in other industries consuming large quantities of phenol, places this important coal-tar chemical in a strong position.

Refiners of naphthalene have renewed prices for the next season at unchanged price levels. What savings have been effected by slightly lower prices for crude have been offset by higher labor, container, and manufacturing costs. Trading in crude was exceptionally dull in the past month with prices nominally at $2.25 to $2.50, but rumors of $2.15 being done were reported in the trade.

The other important price change of the month was a 10c advance in refined anthranilic to a basis of 95c to $1.00 per lb. No change was reported in quotations for technical.

Benzol shipments were again heavy, a large proportion going to blenders and for export. The firm tone in cresylic remains unchanged, and spot stocks are scarce. Intermediates and colors are moving out in satisfactory volume despite uncertainties in certain divisions of the textile industry and in the tanning field. The solvents, toluol, xylol, and solvent naphtha are no longer as difficult to obtain for spot delivery as they were a few months back but this condition is expected to be temporary for a large volume of business has been booked for delivery in the final quarter.

Automobile production is expected to register good increases over the '36 level in the next few weeks, but it is expected that output in the last two months of the year will show a decline below last year's figures. October production will be heavy because of the earlier date for the N. Y. City opening and a desire on the part of makers to stock dealers before models are officially announced. Lacquer producers, and hence suppliers of solvents, are optimistic over the outlook over the balance of '37. In many quarters it is still expected that a 5,000,000 car year is possible.

A slightly improved situation exists now on spot stocks of phthalic anhydride. A new producer is shipping and in the past month American Cyanamid announced plans for adding 5 new units which, it is said, will add approximately 5,000,000 lbs. more to the plant's capacity.

Coking coal charged in by-product ovens in July amounted to 6,280,944 tons, against 5,787,926 tons in June and 5,271,000 tons in July last year. Total for the first 7 months amounted to 43,202,770 tons, against 34,631,900 in the same period a year ago. Tar recovered in July amounted to 55,649,163 gals., against 51,381,024 in June and 46,701,946 in July last year. Total for the first 7 months amounted to 382,776,542 gals., against 306,838,634 in the same period last year. Light oil output was estimated at 18,276,547 gals., against 16,842,964 in June and 15,338,901 in July a year ago. Total for the first 7 months amounted to 902,372,060 gals., against 811,678,829 gals. Ammonia production, sulfate or its equivalent, amounted to 69,204 tons in July, against 64,093 tons in June and 58,238 tons in July last year. Total for the first 7 months amounted to 480,171 tons, against 379,952 tons in the same period a year ago.

A good outlook for steel demand over the balance of '37 seems likely, so that the probabilities are that coking operations will expand further, increasing the total volume of raw materials for the manufacture of coal-tar chemicals. Yet no surpluses are expected, particularly so if a sudden fall expansion in general business takes place.

Eugene Merz Dies at 68

Eugene Merz, 68, general manager of Heller and Merz for thirty years, died at his home, 80 So. Orange Ave., Florham Park, N. J., on Sept. 5. Mr. Merz had been active in civic and banking affairs in Newark for many years as well as in the chemical and dye fields. He retired from the company in 1932 after 40 years of service, two of which were spent as president.

Mr. Merz, who was born in N. Y. City, was the son of one of the founders of the Heller & Merz Co. He became president of the company in 1930 on the retirement of Edgar W. Merz. It was then that the firm, manufacturers of chemicals and dyestuffs, was bought by American Cyanamid.

Mr. Merz also was for 25 years a director of the Federal Trust Co. He was a charter member of the Ironbound Manufacturers' Association. He was graduated from the Columbia School of Mines.

He leaves 4 daughters, Ottilie and Elizabeth Merz, Mrs. Frida Krollpfeiffer and Mrs. George Prochazka, and a brother, August Merz, with Calco Chemical.

Fine Chemicals

Japanese Products Skyrocketing

Regular Fall Medicinal Demand is Up to Average—Mercury Price Shades Off—

Decided improvement in the demand for a wide variety of items entering into fall and winter medicinal preparations was noted in the final two weeks of September, but the principal interest in the trade momentarily centers in the Far East situation. Japanese menthol has advanced to $3.40-$3.50 level. Although several shipments are afloat and may, when landed, ease the current situation slightly, a tight market is anticipated and possibly higher prices before the new crop movement gets under way late in November and December. Camphor is moving briskly as consumers feel it advisable to keep well-stocked in view of the uncertainties caused by the Sino-Japanese crisis. Prices have been advanced but dealers with stocks are finding no trouble in moving material into consumers' hands.

A 5c increase in acetylsalicylic acid has been placed in effect and the advance in phenol of ¾c is held responsible for the rise. The new schedule is 55c in 25-lb. barrels or 100-lb. kegs, and 56c in 25-lb. drums. Sodium salicylate is up 5c per lb.

Prices on an imposing list of items were advanced last month. In nearly all cases higher labor costs are one contributing factor, and in many instances much higher prices for raw materials are being forced on the manufacturers. The new quotation for gallic acid, N.F. 1V, is 87c, an increase of 10c per lb. Prices on U.S.P. pyrogallic acid (crystals and resublimed) have been advanced to $1.45-$1.63 for crystals, and $2.05-$2.15 for resublimed.

Scarcity of raw material has forced a 10c advance in U.S.P. tannic. The new schedule is fluffy, 1,000 lb. lots, bbls., 88c per lb.; 100-lb. lots, 90c; powder, bbls., 1,000 lb. lots, 78c; smaller quantities, 80c. It is reported in the trade Chinese gall nuts are unobtainable at the primary source.

Certain of the bromides have been selling, according to manufacturers, at very close to production costs and in the final week of September cadmium bromide was raised 22c, calcium bromide 10c, and lithium bromide 20c per lb. The advance in the cadmium salt is particularly understandable for spot stocks of the metal cadmium are almost unobtainable, and current quotations are strictly nominal.

The recent strength in the tartars continues unchanged, although no further price advances have been announced. The cost of raw material, report tartar producers, may go still higher, and consumers are closely watching market developments.

On the downward side mercury held the spotlight, closing out the month at $89 a flask. Momentarily demand is specially quiet. This combined with increasingly large shipments from abroad has caused the current price recession. As yet no change has been made in mercurials since the metal started to slide back a few months ago.

Japan's output of natural camphor will be augmented in the near future by the establishment of plants for the production of this product synthetically.

U. S. Mercury Output Lower

U. S. output of mercury in 1936 amounted to 16,569 flasks, according to the United States Bureau of Mines, compared with 17,518 flasks in 1935. Production declined despite increased demand and higher prices. Lower production, however, was not uniform for among the important producing areas Arkansas and Oregon accounted for larger quantities than in 1935. Imports of metal in 1936 were more than twice the amount received in the preceding year and this increase accounted for the much larger supply of mercury for 1936.

The international mercury situation is dominated by the civil war in Spain, where the largest mercury reserves of the world are located, and by the large demands for metal in all consuming nations, partly for armament preparations and partly because of fears concerning future supplies. The termination of war between Italy and Ethiopia and the removal of sanctions against Italy eased the situation somewhat.

An important event in the international situation was the sudden breaking up of the cartel agreement between Spain and Italy. Barring the possibility of destruction of the Almaden mine working and reduction equipment in Spain, the dissolution of the mercury cartel would seem to forecast a renewal of the competitive conditions.

In the United States the maritime strike and bad weather conditions in the final quarter of 1936 contributed to lack of supplies of domestic metal at the end of the year in New York. The larger amount of mercury used for placer gold mining in western states reduced the amount of metal available for shipment. Production by States, is shown in the following table:

	1935		1936	
	Flasks of 76 pounds	Value (1)	Flasks of 76 pounds	Value (1)
Arkansas	304	$ 21,885	(2)	(2)
California	9,271	667,419	8,693	$694,744
Nevada	190	13,678	211	16,863
Oregon	3,456	248,798	4,126	329,750
Utah	....	....	25	1,998
Washington	106	7,631	(2)	(2)
Other States (3)	4,191	301,710	3,514	280,839
	17,518	1,261,121	16,569	1,324,194

(1) Value calculated at average price at New York.
(2) Included under "Other States."
(3) Includes Texas and Arizona in 1935 and Arkansas, Texas, Arizona and Washington in 1936.

Important Price Changes

	Sept. 30	Aug. 31
ADVANCED		
Acid acetylsalicylic	$ 0.55	$ 0.50
Acid gallic, U.S.P.	.87	.77
Acid pyrogallic, U.S.P.:		
Cryst.	1.45	1.30
Resub.	2.05	1.90
Acid tannic, U.S.P.:		
Fluffy	.88	.78
Powd.	.78	.68
Caffeine, alkaloid	2.20	2.05
Citrated	1.80	1.65
Hydrobromide	4.91	4.82
Cadmium bromide	1.66	1.44
Calcium bromide	.70	.65
Camphor (monobromated)	1.75	1.60
Lithium bromide	1.90	1.70
Menthol	3.40	3.25
Sodium salicylate	.52	.47
DECLINED		
Agar No. 1	$ 1.10	$ 1.15
No. 3	.72	.85
Mercury	89.00	92.00
Mercury oxide:		
Yellow, tech.	1.49	1.59
Phenobarbitol	4.00	4.50

Fine Chemical Notes

Fritzsche Bros., N. Y. City, are said to be negotiating for the Kleber or Clifton Chemical plant at Clifton, N. J. Dr. Clement Oscar Kleber, president of Clifton Chemical Laboratories, died on July 14th. (See C. I. Aug., '37, p. 175). He was for many years a director in Fritzsche Bros. before founding the Clifton plant in '06. A change in the zoning laws is being asked of the Clifton Council.

Allen E. Rogers Laboratories, Brooklyn, N. Y., is offering hydroxylamine hydrochloride and hydroxylamine sulfate, rare chemicals used in photographic chemical developers, treatment of skin diseases and in organic synthesis as reagents or reducing agents.

Abbott Expansions

Abbott Laboratories, manufacturer of pharmaceutical, biological, and chemical products, announces completion of a new 4-story research building adjacent to its general offices in North Chicago. New building, which contains 53,000 sq. ft. of floor space, will house a number of specialized research laboratories and a 20,000 volume library.

S. DeWitt Clough, president of Abbott reports formation of Abbott Laboratories of England, Ltd.

Solvents and Plasticizers

Important Price Changes

ADVANCED

None.

DECLINED

Methyl acetone (nat.):	Sept. 30	Aug. 31
Drums	$ 0.36	$ 0.39
Tanks	.30	.33

Brooke Represents Kessler

Kessler Chemical, Hoboken, N. J., division of American Distilling, reports appointment as representative in the Chicago territory of Fred L. Brooke, 228 N. La Salle St., Chicago.

W. W. Angus, sales manager for the Kessler division, states that the recent sale of the industrial alcohol division of American Distilling to Commercial Solvents in no way affects Kessler Chemical, which will continue to manufacture solvents, plasticizers, and special chemicals exactly as in the past. Local warehouse stocks will be carried from which prompt deliveries can be made.

The Fred L. Brooke Co. is widely known in the chemical and color field, particularly in mid-western territory, and represents a large number of other nationally known producers beside Kessler Chemical.

Matthew J. Brenner, with American Mineral Spirits Co., N. Y. City office for 8 years, is now president, N. J. Solvents Co., Secaucus, N. J., dealers in petroleum solvents, kerosene, and fuel oils.

Total number of completed petroleum refineries in the U. S. declined materially in 1936, but the total capacity to process crude oil and to crack unfinished oils continued to increase. About 60 plants were dismantled or removed from the list as being worthless except for junk. These facts were ascertained from the canvass of refinery capacity made by the U. S. Bureau of Mines, Dept. of the Interior, as of Jan. 1, 1937, the details of which will be published later as an Information Circular.

Northwood Chemical (wood chemical products), Phelps, Wis., is in its new office and laboratory, construction of which has just been completed. Company reports appointment of Raphael Katzen as chemical supervisor, and Richard Plow, formerly with the Cleveland-Cliffs Iron, and N. Y. Rubber, as superintendent in charge of new products.

Anti-Freeze Market Steady in Early Fall Stage

Solvents in Good Consuming Demand—Prices Little Changed for '38 is the Trade Opinion—

Official recognition was given to lower prices for natural methyl acetone when announcement was made of a 3c reduction, bringing the level down to 30c in tanks in zone 1 and 36c in drums, carlots. No change in synthetic material was reported.

A broader demand for methanol is noted, particularly for anti-freeze purposes, and prices are steady. Production figures for the first 7 months have been released by the Census Bureau and are as follows:

	Gallons			
	1937		1936	
	*Crude**	*Synthetic*	*Crude**	*Synthetic*
Jan.	525,070	1,835,815	494,081	1,418,863
Feb.	500,685	1,849,302	494,144	1,540,171
March	546,662	2,071,747	476,496	1,631,832
April	531,727	2,138,895	426,313	1,692,921
May	522,961	2,343,497	427,079	1,754,998
June	485,943	2,563,507	413,930	1,863,405
July	465,205	2,564,783	384,751	1,950,825
Tots.	3,578,253	15,077,546	3,116,794	11,853,015

* The refined equivalent would be approximately 82 per cent. of the crude production.

The markets for acetone, butyl alcohol, ethyl acetate and the more important plasticizers were of routine nature in the past 30 days. Lacquer manufacturers have increased their requirements against existing contracts and business booked for the final quarter is heavy. Little new business, however, was negotiated. Prices remain steady.

No price changes in the petroleum solvents were reported in the past month. Refineries have a substantial amount of business booked for the 4th quarter, but negotiations for new business were light in the past few weeks. In the East the best call was for petroleum thinners and V. M. & P. naphthas, while in the middle-west cleaners naphthas were in demand.

Lacquer and synthetic enamel producers supplying the automotive fields stocked up in substantial fashion in September anticipating an excellent final quarter (see analysis of likely automotive production in the Pigments and Fillers Section, this issue).

Large tire inventories which have been plaguing the industry in one way and proving a blessing in another showed a 3.7% decrease in July from the June figure, and declining to 11,654,114. Inventories at the end of August are believed to have eased off further to around 11,250,000 units and probably will show further declines in September, October, and November. Situation has been aided by better consumer demand. Ordinarily replacement tire sales drop in September about 15% below August but in the past month sales have held up close to August levels. The labor situation in the Akron area is still extremely bad with a flare-up possible at a minute's notice.

Sales so far in alcohol anti-freeze have been encouraging. The price structure is holding well at the levels established in August despite the fact that blackstrap was lowered ½c at New Orleans in the past month. Movement of industrial alcohol into consuming channels is quite satisfactory to the producers.

While stocks of c.p. glycerin and other grades are somewhat more plentiful than they were 60 or 90 days ago the market is still firm. Just how much effort the producers will make in the anti-freeze field this year is still unknown.

Announcement was made last month that one unit of the new du Pont ethyl plant at Baton Rouge has gone into production with a final cost of about $3,000,000 and that another unit costing $2,000,000 will be finished early in '38. Capacity at the Baton Rouge plant is estimated at about 50 per cent. of the Deepwater, N. J., factory.

Revised standard for Stoddard Solvent, recommended Jan. 12th and amended June 11th, has been promulgated by the National Bureau of Standards with the announcement that it may be considered effective for new production from Feb. 10, 1938.

Mimeographed copies of the revised standard (CS3-38) have been prepared as TS-2351.

New building of the Petroleum Experiment Station of the Bureau of Mines, at Bartlesville, Okla., will be dedicated on Oct. 19th and 20th. The Bartlesville Chamber of Commerce is coöperating in an extensive program to mark the dedication as a memorable occasion.

Plans for the cellulose film plant to be erected at Clinton, Iowa, by du Pont were outlined Sept. 22nd by John E. Hatt, manager of the "Cellophane" Division, at a dinner given in his honor by the Clinton Chamber of Commerce. Mr. Hatt pointed out that the Clinton plant would be the Company's 7th cellulose film plant and that regular employment would be created for at least 500 persons when production begins in the summer of '39. Most of these employes will be recruited locally. By next April, however, and continuing for more than a year, an average force of 800 men will be required for the plant construction.

The Henry A. Gardner Laboratories, Washington, D. C., has issued a new catalogue of its apparatus for determining physical properties of coatings.

Monsanto Chemicals

For the LACQUER Manufacturer

DIBUTYL PHTHALATE
DIETHYL PHTHALATE
DIMETHYL PHTHALATE
DIPHENYL PHTHALATE
SANTICIZERS (Plasticizers)
- SANTICIZER 8 — Ethyltoluenesulfonamid
- SANTICIZER 9 — Orthoparatoluenesulfonamid
- SANTICIZER 10 — Orthocresylparatoluenesulfonate
- SANTICIZER E-15 — Ethyl phthalyl ethyl glycollate
- SANTICIZER B-16 — Butyl phthalyl butyl glycollate
- SANTICIZER M-17 — Methyl phthalyl ethyl glycollate
- SANTICIZER 1-H — Cyclohexyl paratoluenesulfonamid

SANTOLITES (Synthetic Resins)
- SANTOLITE MHP — Sulfonamid aldehyde resin
- SANTOLITE MS — Sulfonamid aldehyde resin
- SANTOLITE K — Sulfonamid aldehyde alkyd resin

PHTHALYL GLYCOLLATES
TRICRESYL PHOSPHATE
TRIPHENYL PHOSPHATE

For the RESIN Manufacturer

PHENOL
PHTHALIC ANHYDRIDE
MALEIC ANHYDRIDE
AROCLORS (Chlorinated Diphenyl)

SOLVENTS

AMYL ACETATE
BUTYL ACETATE
ETHYL ACETATE
DIACETONE ALCOHOL
MERSOL (Solvent Alcohol)
COTTON SOLUTIONS

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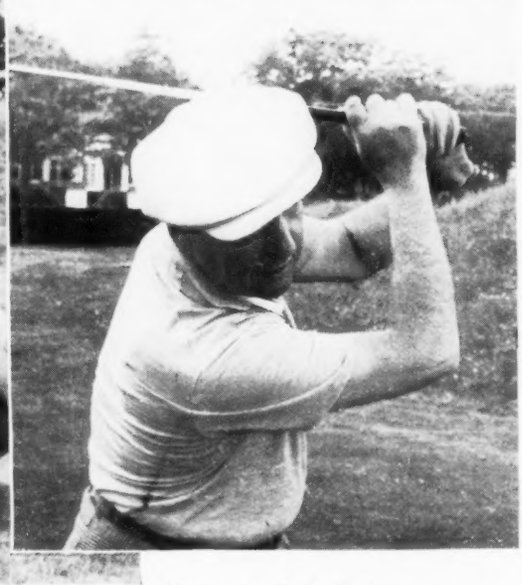
CHEMICAL

The Photographic Record

Left to right, Roy H. Kienle, Calco, F. A. Wardenburg, du Pont, F. M. Moffat, Jr., U. S. Industrial Chemical.

Above
W. F. Van Riper, du Pont
Below
C. A. Higgins, Hercules.

Above, F. Miller Fargo, Jr., Calco; below, H. R. Wemple, Texas Gulf Sulphur.

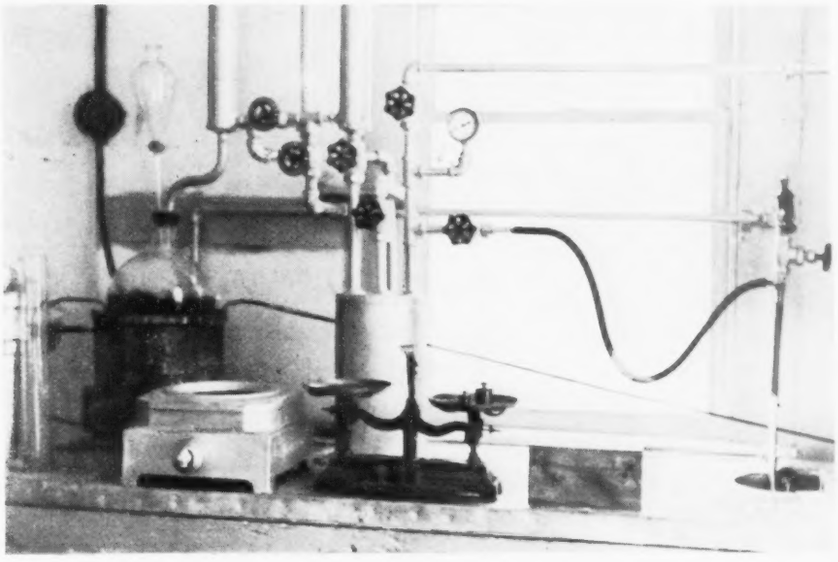


Above, top, F. L. Bodman, center, C. L. Wiswall, R. & H. (du Pont), below, Harold B. Prior, Prior Chemical Corp.

NEWS REEL

of Our Chemical Activities

The five dollar prize for the best chemical snapshot goes to W. K. McPherson, Atchison, Kansas, for the photograph below. Send us a picture for next month's contest. It must be clear and it must be chemical: these are the only requirements.



The only commercial scale isonitrile unit in existence now in operation at the plant of Bailor Mfg. Co., Atchison, Kans., designed for production of mixed isonitriles to be used in denaturation of alcohol used in alcohol-gasoline blends. It is capable of producing ten gallons or more daily. All of the operations are carried out in a closed system so that the room in which the apparatus is installed is entirely free from the obnoxious odor of the compounds.

Dr. A. A. Bates who recently joined the staff of the Westinghouse Research Laboratories as manager of the chemical and metallurgical division.

Hobbies are certainly one of the most interesting items detailed in the biographies of the "Chemical Who's Who," and Carl A. Funke of the Nova Chemical Corp. rides his own hobby-horse with consummate skill. His painting of Still Life was hung last year at the Allied Artists' exhibit in the Vanderbilt Galleries, New York City.

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Molecular Weight	**98**
Density	**1.42 at 28° C**
Melting point	**52.6° C**
Boiling point	**202° C**

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PHTHALIC ANHYDRIDE

An improved, pure white flake product particularly adapted for colorless resins.

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NATIONAL QUALITY

Agricultural Chemicals

Fertilizer Outlook Less Promising

Farm Income Shrinks on Falling Agricultural Prices—Government Investigating Utah Phosphate Bed—

The raw fertilizer materials markets continued in the doldrums through September. Sixty to 90 days ago the fertilizer industry was full of optimism over the prospects for the coming winter and spring shipping seasons, but at the moment, definite signs of pessimism are apparent. Crop prices have sagged badly cutting into the anticipated income of the farmer, although the Bureau of Agricultural Economics states in the September issue of *The Agricultural Situation* that "the buying power of the farmers' income this year will be virtually back at the '29 level."

Other uncertainties exist. The cotton situation is difficult to interpret. The large increase in the '37 crop predicted by current government reports indicates to many the possibility of unwieldy surpluses such as have caused serious difficulties in the past. To some extent this will be offset, it is expected, by the government decision on cotton loans, which will enable orderly marketing and should, it is hoped, prevent large price fluctuations. The cotton loan is tied up with a crop reduction plan, the details of which to date are uncertain and requiring considerable explanation and interpretation. The Wallace program of crop reduction not only for cotton but other major crops makes it almost impossible to predict '37-'38 fertilizer sales.

Fertilizer manufacturers are concerned with the wages and hours bill on which no action was taken at the last session but which will more than likely find a prominent spot in the next session starting in January or at a special one if it is called. While an amendment was proposed which would have added the fertilizer industry to other seasonal trades given special exemption, executives of the industry are frankly concerned. Likewise they are concerned at the activity of certain labor organizations attempting to organize labor in the field. Because of the seasonal character of the industry such a program offers many likely difficulties.

Price changes in raw materials were comparatively few last month. The higher prices for sulfate automatically went into effect on Sept. 1st. On Oct. 1st the 5% discount on potash purchases ended. It is reported that mixers in some instances have failed to place as much tonnage as expected, preferring to await developments, although they may later be forced to replenish stocks at higher price levels. The organics appeared to be somewhat better stabilized, but they still are the "weak sister" as a result of the large tonnage of cottonseed meal which will be available shortly at comparatively low prices. Heavy rains in the South last month it is said will substantially increase the amount of off-color meal.

Southern producers of superphosphate have failed so far to follow the suit of the Baltimore and northern producers in increasing the price 50c a ton, but there is talk in the market that they will be forced to do so because of higher labor costs and the comparative scarcity of sulfuric.

The industry in general and the phosphate producers in particular are showing deep concern over the proposal to have the government develop the huge phosphate deposits of the intermountain west, including Utah, Idaho, Wyoming and Montana. Experts and government officials are making a 3-weeks tour which will end with an open conference at Pocatello, Idaho, on Oct. 8th and 9th. TVA's Dr. Harry Curtis is in charge of the survey and study.

July production of superphosphate was much the largest for the month in several years, exceeding July of last year by 24%. Aggregate output was 247,632 tons, representing a seasonal rise over June which is usually the low month of the year. Beginning with July the seasonal trend is upward through December. Increase in July production was particularly large in the Southern Area. For the first 7 months a 49% increase was registered over the same period of '36, with a 35% rise reported by Northern acidulators against a 63% increase in the South.

July shipments were at an unusually high level for the month with all classes of shipments registering sharp increases over July, 1936, except those to other acidulators. July shipments are relatively unimportant, accounting in the past for only approximately 2% of the total year's shipments to consumers and less than 5% of the annual shipments to mixers. When comparison is made for the first 7 months it will be noted that there have been substantial increases over '36, with shipments to mixers 41% larger, shipments to consumers 10% larger, and shipments in base and mixed goods 17% larger.

J. W. McGinnis, formerly located in American Potash & Chemical's Baltimore office, is now manager at Chicago. R. B. Putnam fills the vacancy at Baltimore.

J. W. Dean, Knoxville Fertilizer Co., Knoxville, Tenn., who was operated on recently for appendicitis, is recovering rapidly.

Tunisia deliveries of phosphate rock increased 20% in the first half of '37 over the corresponding period of '36.

Important Price Changes

	Sept. 30	Aug. 31
ADVANCED		
Ammonium sulfate	all packings	$1.00
Blood, Chgo.	$ 3.20	$ 3.15
Imp.	3.45	3.40
Tankage feed, Chgo.	3.25	3.00
DECLINED		
Bone, steamed (imp.)	$22.00	$22.50
Dom. 1¼ & 60 Chgo.	20.00	22.00
3 & 50 Chgo.	24.00	25.00
Dicalcium phosphate	.74	.75
Fish meal (Jap.)	47.00	47.50
Dom., ungrd.	3.25	3.50
Hoof meal, Chgo.	3.40	3.50
Menhaden meal	52.00	56.00
Nitrogenous mat. (West.)	2.40	2.85
Tankage, Chgo., fert.	2.75	3.00
Imp.	3.50	3.60

August Tag Sales Low

Sales of fertilizer tax tags in the South in August were less than in August of the past 3 years. This decline is without any particular significance since sales in August are relatively unimportant and year to year changes in the month's sales are rather erratic. In the past several years proportion of the entire year's sales in August was only slightly over 1%.

In the first 8 months of the year total sales in 12 Southern States were 26% larger than in the corresponding period of '36 and 36% larger than in '35.

August sales in the Midwest are relatively more important, due largely to the tonnage required for the fall wheat crop. In recent years August sales in the 5 Midwestern States were nearly one-fifth of the entire year's sales. It is of some interest, therefore, that aggregate sales in this region in August exceeded last year by 28%. August tag sales in 17 states totalled 162,219 tons.

Several new fertilizer plants were announced last month. A new factory will be operated at Moultrie, Fla., by C. O. Smith and J. E. Ladson; Central Chemical has been incorporated at Milton, Md., with F. M. Thomas as president; Alabama Fertilizer will start at Montgomery, Ala., with Wiley C. Hill as president.

George M. Barley, Jacksonville, is now associated with Ashcraft-Wilkinson Co., Atlanta. W. L. Gay, formerly with the N.F.A., is now with F. W. Berk & Co., N. Y. City.

A $150,000 fire destroyed the well-known fertilizer plant of Rogers and Hubbard Co., Portland, Conn., on Sept. 2nd. By a strange coincidence F. Perry Hubbard, 76, president of the company for 35 years, died earlier in the day following a long illness. Spontaneous combustion is said to have caused the fire.

Fats and Oils

Hooker to Hydrogenate

Hooker Electrochemical is building a plant for hydrogenation of fatty oils at their Tacoma, Washington, factory. New plant will utilize by-product hydrogen from electrolytic caustic soda and chlorine manufacture. Installation will include hydrogen compressors, high-pressure gas storage, hydrogen converters, oil refining equipment and extensive storage facilities for raw and finished oils. Total cost including buildings will be in the neighborhood of $110,000. Alan Porter Lee, Inc., N. Y. City, are consulting and contracting engineers for the installation; Wurster and Sanger, Inc., Chicago, Ill., are associate consulting engineers and McKim, Mead and White, N. Y. City, are the architects. Company's engineering and development dept. at Niagara Falls is in charge of the work.

Litter Party for Paint Men

David H. Litter, president of D. H. Litter Company, manufacturers' representative, N. Y. City, was host to 150 paint industry technicians on a boat ride up the Hudson River, Saturday, Sept. 11th. Cruise was the second annual event sponsored by Mr. Litter and his principals which include Falk & Co., Pittsburgh; Nuodex Products, Elizabeth, N. J.; Pure Calcium Products, Painesville, Ohio; Wilson & Bennett Manufacturing Co., Chicago; Anderson-Prichard Oil, Oklahoma City, and Pacific Vegetable Oil and Metalead Products Co., both of California.

Balfour, Guthrie & Co., Ltd., vegetable oils and related products, San Francisco, is preparing to open an office in Chicago for trading in vegetable oils.

American industry's triumph through chemistry in a chemical age will be reflected by outstanding exhibits of leading manufacturers at the 16th Exposition of Chemical Industries to be held at Grand Central Palace, N. Y. City, Dec. 6 to 11th. Fundamental relation of all industries to chemical processes and the advanced state of national recovery are combining to make this year's Exposition the greatest one to date. Indications 4 months in advance of opening reveal a spirit of enthusiasm and comprehensive effort in exhibit planning on the part of many of the most representative concerns. A slogan contest, offering a first prize of $250 for the best description of the function and service of the chemical industries, is drawing additional national attention to the event.

Cottonseed, Tung and Bean Oils Plentiful

Prices Under Pressure of Bumper Crops—Paint Trade Demand is Holding Well Into Fall Season—

Cottonseed oil trend was generally downward last month. A cotton crop of 16,098,000 bales would mean an oil crop of 3,850,000 barrels, compared with 3,200,000 for last year and only 2,626,000 in the year previous, and with an average annual consumption of domestic oil of about 3,000,000 barrels. The extremely bearish attitude towards cotton oil is tempered somewhat by the reduction in hog slaughter, July figures being only 1,600,000 head, as compared with 2,700,000 last year. According to the Bureau of Agricultural Economics the prospect is for fewer hogs coming to market this fall than last, but a considerable increase is expected in the '38 spring pig crop. So far this season soybean has been higher priced than cotton oil and as a result has not figured much in the edible trade. With large production this season, however, the trade is wondering what the relationship of the two will be a few months hence.

Receipts of tung oil also increased substantially from 83 to 96 million lbs. during these periods, but due to lower price levels the invoice value remained at around 10½ million dollars. Arrivals of Manchurian perilla oil, however, imports of which aggregated better than 81 million lbs. in the first half of '36, declined to only 18 million lbs. in the corresponding period of the current year. This decline was due to an excise tax being placed on this product in the latter half of last year. A revival in this business is indicated, however—9 million lbs., or half the total for the entire 6 months, were brought in during June.

Most spectacular gain was recorded in receipts of flaxseed. Imports aggregated 17,554,000 bu., valued at $21,322,000, in the first half of the current year which compares with 6,823,000, valued at $6,522,000, in the corresponding period of '36.

American paint and varnish manufacturers and others employing tung oil have shown considerable concern in recent developments in China which have almost entirely cut off our supplies of this essential drying oil.

American manufacturers now use well over 100,000,000 lbs. of tung oil per annum, and with the exception of some 2,000,000 lbs. being produced on southern (U. S.) plantations, all of this oil comes from China.

Fully 90 per cent. of China's tung oil is produced in the Yangtze river basin and clears down that river through Hankow for transshipment to ocean going vessels at Shanghai. So far as is known no oil is clearing through Shanghai at present and in August, prior to the outbreak of hostilities, shippers were able to ship only 2,000,000 lbs.

Efforts are being made at Hankow to ship oil over the Hankow-Canton railway to Canton for transshipment through the British port of Hong Kong. Approximately 300,000 lbs. of oil are reported to have left Hankow for Hong Kong in August and shipments over this route during the current month are expected to be somewhat heavier. As a result of the unusually heavy importation of tung oil into the U. S. during June, July, and August, stocks on hand at present are somewhat heavier than usual, according to C. C. Concannon, chief of the Chemical Division, Bureau of Foreign & Domestic Commerce. On Sept. 1st stocks in the hands of manufacturers and in warehouses were in the neighborhood of 60,000,000 lbs., he estimates, which at the present rate of consumption should be sufficient at least for normal requirements through the balance of the current year. At the moment Chinawood quotations are nominal on futures and little spot material is changing hands.

The sensational rise in Chinawood prices naturally has forced higher prices for competing oils, or ones that can be substituted, such as oiticica and perilla. Very little help can be expected from oiticica for only 1,272,000 lbs. were imported in the first 5 months of the year and none in June and July. The Chemical Division of the Bureau of Foreign and Domestic Commerce estimates but 15,000,000 lbs. of perilla in stock in the U. S. as of Sept. 1st and estimates consumption in the past 6 months at about 4,000,000 lbs. monthly.

Purchasing Agents Association of Chicago will hold its 9th annual products exposition at the Sherman on Nov. 17th and 18th. Program includes a luncheon meeting Nov. 17th and the banquet on the following evening.

Du Pont awards 24 chemical research fellowships; same company purchases 5,000 sq. ft. in San Francisco's '39 Golden Gate International Exposition.

Charles Fischbeck Co., essential oils and aromatic chemicals, N. Y. City, appoints Davis & Davis, Inc., Wrigley Bldg., Chicago, as sales representative in Chicago and Milwaukee territory.

James MacGregor, assistant to John A. Chew, N. Y. City chemical merchant, is visiting Scotland. He sailed in the *Queen Mary* early in September.

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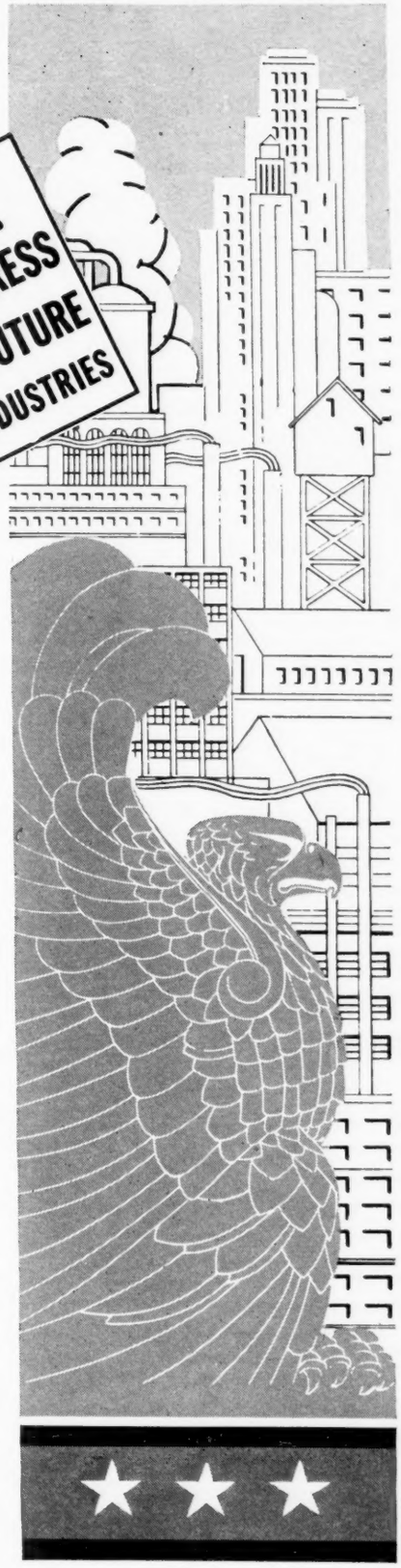
A PREVIEW OF THE FUTURE
FOR THE PROCESS INDUSTRIES



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Pigments and Fillers

Important Price Changes

	Sept. 30	Aug. 31
ADVANCED		
Antimony pigments (white)	$ 0.12½	$ 0.11½
Cadmium lithopone:		
Red	all grades 6c	
Yellow	all grades 6c	
Tungstated colors	25c to 65c, depending on grades	
Zinc oxide, Am. 35%	.0645	.06¼
50%	.06⅝	.06⅜
DECLINED		
Calcium sulfide (luminous)	$ 0.75	$ 0.85
Mercury oxide, yellow	1.49	1.59
Lead, Red	.08¾	.09
Litharge	.07¾	.08

New Red Lead Standard

National Bureau of Standards is preparing a proposed revision of federal specification TT-R-191 for red lead, which will be mailed out in October. Proposed revision will provide for a 97% grade red lead in addition to the present 85% and 95% grades.

Bureau reports an excellent response from manufacturers on its recent proposals for revision of the specifications for lead zinc base paint and for putty (TT-P-36 and TT-P-791).

Girbotol Process at Cabot's

Cabot Carbon has recently completed and placed in operation a Girbotol purification unit in its new gasoline plant at Kermit, Tex. The Girbotol unit, which is very similar to the one which has been in operation for the past several years in the Shell-Continental plant at Hobbs, N. M., removes hydrogen sulfide from natural gas used as engine fuel and for domestic heating.

The Girbotol process, which is licensed by The Girdler Corp. of Louisville, will also be used by Gulf Oil for removing CO_2 from synthetic hydrogen in the company's new iso-octane plant now under construction at Port Arthur, Tex.

Beck, Koller's Dr. Wilhelm Krumbhaar has just returned from a 30,000 mile round-the-world trip. He is already on his '37-'38 program of talks before paint, varnish and lacquer production clubs.

Dr. Gustave W. Thompson, National Lead chief chemist, has been elected to honorary membership of the A.S.T.M.

John R. MacGregor, who left Eagle-Picher Lead, has started the John R. MacGregor Lead Co., 4520 W. 15th St., Chicago. Company makes oxides and white lead.

Paint Materials Score Price Advances

Construction Work Holds Up—Carbon Black Exports Larger —Pigment Prices Up Sharply—

A slight improvement in purchasing of raw paint, varnish and lacquer materials was reported in the trade in the last half of September. Paint makers are banking heavily on a good fall season and lacquer producers anticipate heavy demand immediately from the automotive centers.

Prices advanced along a wide front last month. Red and yellow cadmium lithopones were advanced 6c, antimony white pigment 1c, tungstated colors were "upped" 25 to 65c per lb. American process 35% leaded zinc oxide was advanced 1/5c and the 50%, ¼c. A sudden decline of $5 per ton in lead on Sept. 24th brought a reduction in red lead to 8¾c, litharge to 7¾c. No changes have been announced in dry colors, ester gums, stearates and other items sold on a quarterly basis. Keg prices for white lead-in-oil have been changed. Price differentials for quantity buyers have been discontinued, and under the new plan there are 3 prices, dealer, painter, and one for the consumer. Varnish gum prices are generally higher and are dealt with in greater detail in the Raw Materials Section. Turpentine has again slumped badly.

The August record of total construction in 37 Eastern States amounted to $285,104,100, as reported by F. W. Dodge Corp. This contract volume compares with $275,281,400 for August of last year and with $321,602,700 for July of this year. Of the August '37 volume, $73,448,300 represented residential building, $117,209,800 non-residential building and $94,446,000 was for public works and utilities.

Commenting about the August construction total, T. S. Holden, vice-president of Dodge, stated that: "Approximately two-thirds of the July to August decline in contracts was due to a decrease in the amount of publicly-financed work." In addition, there occurred, also, a drop of more than $30,000,000 in the total for unusually large projects, jobs costing a million dollars and over and which happened to start during July rather than during August. In spite of these two adverse influences, the August total represented a gain of 4% over last year and a decline of less than 11% from July of this year.

Construction during September is still showing the slower pace that has marked the activities of the industry for the past several months. During the initial weeks of the current month the total of contracts let declined below a year ago and unless there is a spurt in the closing weeks it is likely September will record the first decline in many months.

Foreign demand for American paint products continued especially active in July and resulted in exports of ready mixed paints, varnishes and lacquers reaching a level which has been exceeded only once in the past 5 years. Total value, including pigments, was recorded at $1,748,000 during the month which compares with $1,394,000 for July, '36, an increase of almost 25%. Export shipments of ready mixed paints, varnishes and lacquers aggregated 483,479 gals., valued at $767,500 in July against 353,000 gals. valued at $584,600 in the corresponding month of last year.

Exports of chemical pigments, including carbon black, were recorded at 15,400,000 lbs. valued at $826,000 during the current July against 12,178,000 lbs. valued at $680,000 in the corresponding month of last year. In this group, shipments of carbon black increased from 10,140,000 lbs. to 13,397,000 lbs. during the periods under review.

Columbian Carbon has adopted a comprehensive insurance plan for all its employees and those of its 11 subsidiaries; Krebs Pigment will erect a 5-story building at its Baltimore works; Columbian Carbon's carbon black sales are running 28% ahead of last year; United Carbon has completed its new central control laboratory at Borger, Tex.; Titanium Pigment's paper development laboratory has been moved to 99 Hudson St., N. Y. City, from its former Brooklyn location.

Japan is rapidly becoming self-sufficient in carbon black which until recently it obtained almost entirely from the U. S. It is estimated that plants in operation and coming into production in the oil fields of Formosa will supply 3,350 metric tons during the current year which is well over half its normal requirement for this product.

Paramet Chemical directors have elected Dr. I. Rosenblum as president; A. J. Wittenberg, vice-president; George Weintraub, treasurer; and N. P. Moss, secretary.

Harry A. Passof, a vice-president, treasurer and director of Paramet Chemical, N. Y. City, is no longer actively connected with the company. His headquarters are now at 24 Stone St., N. Y. City. He was with the company for 17 years.

Stanley C. Dunning of the Muralo Co. is the new president of the N. Y. P. V. & L. A. Harry R. Hillman, Eagle Paint & Varnish, is vice-president, and Harold A. Wakefield, Imperial Color, is secretary. Hendrick E. Hendrickson of S. Winterbourne & Co. is treasurer.

Varnish Gums Headed for Price Rise

Government Sales Upset the Turpentine Price Structure—Chinese Materials All Advance—Waxes are Weaker—

For several months past cables from the primary sources of varnish gums have indicated the likelihood of much higher replacement costs eventually and in the past two weeks these forecasts have proven to be just about 100% correct. With but one or two exceptions all of the various gradings of Congo moved up sharply in the final week of the month, the increases amounting to ¼c to 1⅝c; all important gradings of Batavia were advanced from ½c to 1½c. These increases were in addition to substantial increases in many of these grades earlier in the period. Movement of gums from the interior to shipping points has been extremely light, while stocks at primary points have dwindled, hence the present strong price position.

Japan wax has rebounded further from the soft price position of a few months back. Spot material is offered at 11 to 11¼c and consumers are stocking substantially, fearing a possible shut-off from supplies because of the Chinese war.

African beeswax at the close of the month was lowered to 27c-27½c, according to quantity, while Chilean and Brazilian were advanced to 30c. Candelilla was weaker and quoted at 13c-13½c. Quite unexpectedly little demand for Carnauba is reported at the moment, a period when buyers are usually active. In the primary market prices were off ½c-1c on new crop. Spot quotations on No. 3 N.C. and No. 3 chalky worked to lower levels.

Hostilities in China are held responsible for a 5c advance in egg albumen and a 3c increase in egg yolk. Stocks of imported materials are low with little prospect of replacements arriving for some time. Purchasing of natural tanstuffs and dyestuffs was of a routine character. Valonia beards were subjected to two $. increases and mangrove bark was advanced 50c a ton. A steady demand for extracts was reported at firm, but unchanged prices. Tanners' oils are in fair demand. Newfoundland cod is quoted at 51c in drums and 48c in tanks. Cold pressed fish is quoted at 49½c in tanks and 57c in drums. Neatsfoot (20c) is now 16½c; extra, 11¾c; No. 1, 10¾c. Sulfonated cod is 7½c; with 25% mineral oil, 6¾c. Sulfonated castor is priced at 11c for 75% grade.

Little change has taken place in the basic situation in shellac. Slightly firmer trends in London and Calcutta last month were within too narrow limits to effect spot prices. The hoped-for increase in demand has so far failed to materialize in a substantial way.

No one seems to know the answer to "What is the matter with turpentine?" Despite a fairly satisfactory statistical picture "turps" dropped 2c in the Savannah market on Sept. 27th following an almost uninterrupted decline throughout the month. At 25½c turpentine is just one-half the price it was in the primary market earlier in the year. It is said that private bids made in primary centers late last month were the lowest in 39 years.

Part of the current demoralization is blamed upon a reported sale of 20,000 barrels in Jacksonville by government agencies at a reputed price of 3 or 4c below the then existing market. It is said that 40,000 additional barrels still remain in government hands against which loans were made by the Commodity Credits Corp. Little support to the market is likely on the part of consumers or dealers until the fate of these become definitely known.

Rosin has fared better. Statistically its position is good. The peak of the new crop movement is about over. At the start of the new crop year on April 1st rosin stocks in the South were 209,514 barrels. On Sept. 8th the *Naval Stores Review* reports them at 202,922. On the corresponding date of last year they were 326,000 and two years ago 500,000 barrels. Receipts to date have been 20,000 barrels less than last year, while shipments for the first half of the crop year have been 34,000 barrels more. Fear that this year's crop would exceed last by 150,000 barrels has now disappeared, and the total is expected to just about equal '36-'37.

Changes in the primary markets for the month are summarized as follows:

	Aug. 27	Sept. 24	Net Gain or loss
Savannah:			
B	$7.80	$7.50	—$0.30
D	7.85	7.50	—.35
E	7.85	7.50	—.35
F	8.00	7.85	—.15
G	8.00	7.85	—.15
H	8.00	7.85	—.15
I	8.00	7.85	—.15
K	8.00	7.85	—.15
M	8.00	7.85	—.15
N	8.05	7.90	—.15
WG	8.20	8.15	—.05
WW	8.80	8.60	—.20
X	8.80	8.60	—.20
Stocks	64,982	64,269	—713
Turpentine	.31½	.30	—.01½
Stocks	34,525	40,682	+6,157
Jacksonville:			
Rosin stocks	27,418	34,175	+6,757
Turpentine	28,132	29,474	+1,342
Pensacola:			
Rosin stocks	25,717 (Aug. 21)	24,480 (Sept. 18)	—1,237
Turpentine	22,450 (Aug. 21)	24,476 (Sept. 18)	+2,026

Refined platinum metals recovered in the U. S. in '36 totaled 46,946 troy ounces, compared with 42,060 in '35, according to the Bureau of Mines.

Natural Raw Materials

Important Price Changes

ADVANCED

	Sept. 30	Aug. 31
Albumen, egg	$ 0.85	$ 0.80
Egg yolk	.60	.57
Mangrove bark	25.50	25.00
Valonia beards	50.00	48.00

DECLINED

None.

Record Carnauba Output

In the Pernambuco District of Brazil which includes the States of Ceara, Rio Grande do Norte, Parahyba, Pernambuco and Alagoas, conditions during the latter part of 1936 and the early months of 1937 were unusually favorable for the production of carnauba wax which was reported to have been on a record-breaking scale. Droughts and high prices resulted in agriculturists devoting more time and attention to the extraction of the wax. Total output of the wax in the district for the crop year 1936-1937 was estimated at approximately 6,200 metric tons, as compared with 4,100 metric tons for the preceding year.

The 1936-1937 naval stores crop season in Greece closed with highly satisfactory returns both for producers and exporters. Production was the highest on record, as estimates made the first part of June indicated that about 28,750 American bbls. of turpentine and approximately 94,500 American bbls. of rosin were manufactured as compared with 26,900 American bbls. of turpentine and 84,500 bbls. of rosin for the '35-'36 crop year.

Approximately 54,740,000 lbs. of varnish gums valued at $4,361,000 were imported during the first half of the current year, compared with 34,000,000 lbs., valued at $2,694,600, in the corresponding period of '36—a quantity gain of more than 60%.

By commodities receipts of damar increased in quantity from 7,973,000 to 10,396,000 lbs.; kauri, from 521,000 to 1,060,000 lbs.; crude lac, from 6,695,000 to 12,630,000 lbs.; unbleached shellac, from 7,962,000 to 15,313,000 lbs.; bleached shellac, from 175,000 to 273,000 lbs.; and other varnish gums, including copals, from 10,785,000 to 15,000,000 lbs.

Dr. William Howlett Gardner, research professor of chemical engineering at Brooklyn Poly, will lecture on shellac before the North Jersey Section on Oct. 11th at the Hotel Winfield Scott, Elizabeth, N. J. Dinner will be served at 6.30 p. m.

Stocks and Bonds

Dividends and Dates

Name	Div.	Stock Record	Payable
Abbott Labs., ext.	10c	Sept. 14	Sept. 30
Abbott Labs.	40c	Sept. 14	Sept. 30
Air Reduction, ext.	75c	Sept. 30	Oct. 15
Air Reduction	25c	Sept. 30	Oct. 15
Am. Agr. Chem.	$4.00	Sept. 10	Sept. 30
Am. A. & B.	15c	Sept. 20	Oct. 1
Am. Hard Rub., 8%	$2.00	Sept. 15	Sept. 30
Am. Maize Prods., pf.	$1.75	Sept. 23	Sept. 30
Am. Smelt. & Ref.	$1.75	Nov. 5	Nov. 30
Am. Smelt. & Ref., pf.	$1.75	Oct. 8	Oct. 30
Borne-Scrymser	75c	Sept. 24	Oct. 15
Canadian Ind., Cl. A	$1.75	Sept. 30	Oct. 30
Canadian Ind., Cl. B	$1.75	Sept. 30	Oct. 30
Canadian Ind., Ltd. 7%	$1.75	Sept. 30	Oct. 15
Clorox Chemical	75c	Sept. 24	Oct. 1
Colgate-Palmolive-Peet, pf.	$1.50	Sept. 4	Oct. 1
Con. Chem. Ind., Cl. B, ext.	12½c	Oct. 15	Nov. 1
Con. Chem. Ind., Cl. B	37½c	Oct. 15	Nov. 1
Devoe & Raynolds, Cl. A	75c	Sept. 20	Oct. 1
Devoe & Raynolds, Cl. B	75c	Sept. 20	Oct. 1
Devoe & Raynolds, pf.	$1.75	Sept. 20	Oct. 1
Dow Chemical	75c	Nov. 1	Nov. 15
Dow Chemical, pf.	$1.25	Nov. 1	Nov. 15
du Pont (deb.)	$1.50	Oct. 8	Oct. 25
*du Pont $4.50 pf. in.	$1.35	Oct. 8	Oct. 25
Eagle Picher Lead	10c	Sept. 15	Oct. 1
Eagle Picher Lead, pf.	$1.50	Sept. 15	Oct. 1
Freeport Sulphur, pf.	$1.50	Oct. 15	Nov. 1
Gen. Printing Ink	30c	Sept. 20	Oct. 1
Gen. Printing Ink, pf.	$1.50	Sept. 20	Oct. 1
Glidden, ext.	30c	Sept. 17	Oct. 1
Glidden	50c	Sept. 17	Oct. 1
Harshaw Chemical, sp.	60c	Sept. 20	Sept. 25
Hercules Powder	$1.50	Sept. 14	Sept. 25
Imp. Chem. Ind., I	3%	Sept. 22	Nov. 8
Koppers, pf.	$1.50	Sept. 11	Oct. 1
Mathieson Alkali	37½c	Sept. 7	Sept. 30
Mathieson Alkali, pf.	$1.75	Sept. 7	Sept. 30
Merck	25c	Sept. 15	Oct. 1
Merck, pf.	$1.50	Sept. 15	Oct. 1
Monroe Chem., pf.	87½c	Sept. 15	Oct. 1
†Monsanto Chem., $4.50 pf.	$1.64	Nov. 10	Dec. 1
Nat. Lead	12½c	Sept. 10	Sept. 30
Nat. Lead, pf. B	$1.50	Oct. 14	Nov. 1
Nat. Oil Products	30c	Sept. 20	Sept. 30
Pittsburgh Plate Glass	$1.00	Sept. 10	Oct. 1
Pratt & Lambert	50c	Sept. 15	Oct. 1
Procter & Gamble, 8%	$2.00	Sept. 24	Oct. 15
Spencer Kellogg	40c	Sept. 15	Sept. 30
Union Carbide & Carbon	80c	Sept. 3	Oct. 1
United Carbon, ext.	50c	Sept. 15	Oct. 1
United Carbon	$1.00	Sept. 15	Oct. 1
United Dyewood, pf.	$1.75	Sept. 10	Oct. 1
United Dyewood, pf.	$1.75	Dec. 10	Jan. 3
United Dyewood, ext.	25c	Sept. 10	Oct. 1
United Dyewood	25c	Sept. 10	Oct. 1
U. S. Smelt. & Ref.	$2.00	Oct. 1	Oct. 15
Victor Chem. Wks.	25c	Sept. 20	Sept. 30
J. S. Young	$1.50	Sept. 24	Oct. 1
J. S. Young, pf.	$1.75	Sept. 24	Oct. 1

* Covers period from July 7, '37 to Oct. 25, '37.

† Represents proportion of the semi-annual dividend for the unexpired period ending Dec. 1.

Board of Directors of Hercules Powder on Sept. 29th declared a regular quarterly dividend of 1½% on its preferred stock. Dividend is payable on Nov. 15th to stockholders of record Nov. 4th.

Fertilizer Companies Make Good Showing

Davison in Black Half a Million—A. A. C. Best Net in Decade —I. A. C. Reports for Last Year—

Davison Chemical reports for its fiscal year ended June 30th consolidated net earnings from current operations of $578,943.28, and aggregate net earnings for the year from all sources of $793,944.96 after all expenses, depreciation, reserves for possible losses, Federal income taxes and taxes on undistributed profits, according to report made public by Chester F. Hockley, president.

This is equal to $1.55 a share on the 511,776 shares of capital stock outstanding.

No accurate comparison of the latest fiscal year's operations can be made with the preceding fiscal year, inasmuch as the company had only 6 months of operations in the '36 fiscal year after termination of the receivership on Jan. 1, 1936. For the 6 months ended June 30, 1936, company earned $184,311, or 36c a share.

The 1937 fiscal year earnings of $578,943.28 from current operations were after setting aside $536,099.99 for depreciation and reserves for possible losses on receivables and after providing $152,392.50 for Federal income taxes and taxes on undistributed profits.

In addition, company had recoveries from assets previously charged off, as well as profits over and above book value of certain assets disposed of in the course of the year, aggregating $215,001.86. These were credited to capital surplus.

Sales of Davison Chemical during the past year increased approximately 20%.

American Agricultural Chemical reports the best net profit in a decade for the fiscal year ended June 30th. Earnings for the period were $1,868,943, equal to $8.86 a share on 210,932 shares of capital stock, against $1,005,813, or $4.71 a share on 213,734 shares in the preceding year.

Passing on to stockholders the increased income, a dividend of $4 has been declared, bringing total payments for the calendar year to date to $6.50. On June 30th, $1.50 was paid, and on March 31st, $1.00. Last December, $1.75 was paid and there probably will be a year-end dividend this year.

Gross operating income for the year was $3,816,358, the best since 1930 when gross was $3,858,000 due to the fact that fertilizer volume last year was also the largest in 8 years.

Last season was the first time since the boom years that the fertilizer industry enjoyed the combination of large volume and a satisfactory price level. In addition, America has for some years augmented the basic division of its business with growing profits from its chemical activities.

International Agricultural, in its annual report for the year ending June 30th, shows a net income of $770,153, which includes $57,622 collected on receivables previously written off. Operating profits for the year were $1,671,476.

Interest on bonds amounted to $255,957, leaving $1,415,519 earned before depreciation on property of $361,874, depletion of $208,490, and a reserve of $75,000 for income taxes and surtax on undistributed profits. This compares with a net income of $23,193 for the year ended June 30, '36.

Colgate Betters Last Year

Colgate-Palmolive-Peet for the 6 months ended June 30th, had surplus net profits of $1,715,606, after deducting a loss of approximately $500,000 flood damage costs at the Jeffersonville, Ind., plant, S. Bayard Colgate, president, reports in a statement.

He stated first half profits were greater than earnings in the '36 period, due to more favorable market conditions, and that they would equal 50c a share on common, after providing for regular preferred dividends.

For the 6 months ended June 30th, 1936, company reported net profit of $370,198 after charges and federal income taxes, equal to $1.50 a share on 246,496 shares of 6% preferred stock.

Glidden's sales for the year ended Sept. 15th have amounted to $47,020,503 as against $38,040,380 in the corresponding period of '36, a gain of $8,980,123, or 23.6%. Sales for the first half of September are up 8.6%.

Subscriptions totaling $6,250,000 have been made to the capital stock of a company which will construct a pulp and newsprint mill at Lufkin, Tex. This is more than 80 per cent. of the total capital required, it was stated, and practically assures that construction of the plant will be started soon. Subscriptions were made at the recent meeting of the Texas Newspaper Publishers Association.

Electro-Metallurgical, a subsidiary of Carbide, is said to have signed a contract with the TVA for the establishment of a plant at Wilson Dam. A giant new rayon plant has been started at Narrows, Va., near Roanoke, by the American Cellulose and Chemical Manufacturing Co. A plot of 1,230 acres has been acquired.

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Chemical Dividends Continue

Du Pont Pays on New Preferred Stock on Oct. 25—Rechristened Ink Company Reports—

Du Pont has declared a dividend of $1.50 a share on the common payable on Sept. 15th to stock of record of Aug. 25th, compared with $2 paid on June 15th and 75c on March 15th. On Sept. 15th and June 15th, last year, dividends aggregating $1.60 a share each were paid, with 90c paid on March 15th and $2 paid Dec. 15, 1936, making total declarations of $6.10 for '36.

The du Pont dividend payable on Sept. 15th, will follow the receipt on Sept. 13th of dividends on 10,000,000 General Motors shares owned by du Pont, amounting to 90½c on each du Pont common share, the same as was received on June 12th, and compared with 22½c from G. M. dividends on March 12th. On Sept. 12, 1936, the General Motors dividend was equivalent to $1.13 a share on the du Pont common, the same as on June 12th, and compared with 45¼c on March 12th and $1.35¾ on Dec. 12, 1936.

Dividends of $4.25 a share declared to date by du Pont out of 1937 earnings compare with $3.31 a share earned on du Pont common stock for the first 6 months of 1937.

An initial dividend of $1.35 a share was declared on the new $4.50 cumulative preferred stock which was publicly offered on June 30th. Disbursement will be made Oct. 25th to stock of record Oct. 8th and covers the period from July 7th to Oct. 25th, or one quarter and 18 days. Hereafter dividends on this stock, which is junior to the debenture stock, will cover quarterly periods.

Report of Interchemical Corp. (formerly International Printing Ink) and subsidiaries for 6 months ended June 30th, shows net profit of $766,483 after depreciation, federal income taxes, etc., equivalent after dividend requirements on 6% preferred stock, to $1.96 a share on 289,058 no-par shares of common stock, excluding 702 shares in treasury. No provision was made for federal surtax on undistributed profits. This compares with $585,711 or $1.41 a share on 281,183 common shares in first half of 1936.

For quarter ended June 30, 1937, indicated net profit, based on a comparison of company's reports for first quarter of fiscal year and the 6 months period, was $361,397 equal to 91c a share on 289,058 common shares comparing with $405,086, or $1.05 a share on 288,358 common shares in preceding quarter and $342,910 or 88c a share on 281,183 common shares in June quarter of previous year.

Net profit for 12 months ended June 30, 1937, was $1,479,886 equal to $3.73 a share on 289,058 common shares, comparing with $1,176,862 or $2.84 a share on 281,183 common shares for the 12 months ended June 30, 1936.

Report of United Carbon and subsidiaries for 6 months ended June 30th, shows net profit of $1,365,368 after charges, depreciation, depletion and normal federal income taxes but before surtax on undistributed profits, equal to $3.43 a share on 397,885 no-par shares of common stock outstanding. This compares with $1,087,607 or $2.73 a share in first half of '36.

For quarter ended June 30th, last, indicated net profit (based on a comparison of company's reports for first quarter of fiscal year and 6 months period) was $643,000 or $1.62 a share, comparing with $722,368 or $1.81 a share in preceding quarter and $519,776 or $1.31 a share in June quarter of 1936.

United Dyewood and subsidiaries for the 6 months to June 30th show a net profit of $234,672, equal, after dividend requirements on 7% preferred stock, to 94c each on 139,000 shares of $10 par common. No provision was deemed necessary for Federal surtax on undistributed profits. In same period last year net profit was $192,805, or 63c a common share.

The Chilean Economic Mission is reported to have reached an agreement with Japanese importers involving the shipment of 50,000 metric tons of Chilean nitrate to Japan during the current year.

Earnings Statements Summarized

Company:	Annual dividends	Net income 1937	Net income 1936	Common share earnings 1937	Common share earnings 1936	Surplus after dividends 1937	Surplus after dividends 1936
American Commercial Alcohol:							
Six months, June 30	*f*	$396,238	$329,026	$1.52	$1.26	.....	.....
American Smelting & Refining:							
Six months, June 30	*y*$6.25	9,624,998	7,807,528	*h*3.38	*x*2.51	$4,127,494	$3,858,582
Archer-Daniels-Midland:							
Year, June 30	*w*.50	2,967,295	1,891,612	5.01	3.05	.....	.....
Chickasha Cotton Oil Co.:							
Year, June 30	*f*	†25,359	128,196	....	.50	.....	.....
Pennsylvania Salt Mfg.:							
Year, June 30	*w*2.00	1,769,407	1,285,645	11.79	8.57	.....	.....
U. S. Smelting, Refining & Mining:							
Eight months, August 31	*y*8.00	4,485,894	3,782,769	6.41	5.08	*.....	*.....

f No common dividend; *y* Amount paid or payable in 12 months to and including the payable date of the most recent dividend announcement; *x* Based on common shares outstanding on June 30th; *w* Last dividend declared, period not announced by company; † Net loss; * Not available.

Wall St. Notes

Davison Chemical's 6½% notes ($3,400,000) are among the list of corporate bonds maturing in October.

Cyanamid stockholders were to vote on the creation of 2,500,000 shares of 5% cumulative convertible preferred stock, $10 par, and an increase in the number of authorized class B common shares to 3,620,000 from 3,000,000 shares at a special meeting on October 4th.

Pittsburgh Plate Glass has voted a distribution of $1 a share on the common, payable Oct. 1st. A disbursement of $2 a share was made on Aug. 20th.

An extra dividend of 12½c and the regular quarterly of 37½c were voted on the Class B common and Class A participating preference stocks of Consolidated Chemical Industries, Inc.

Directors of Glidden recently have declared an extra dividend of 30c in addition to the regular quarterly dividend of 50c on the common. On July 1st last, company paid a similar extra together with the regular disbursement.

An extra dividend of 75c and the regular quarterly distribution of 25c were voted recently on the stock of Air Reduction. Similar payments were made on July 15th.

First public stock offering in the 35 years of existence of Victor Chemical was made Aug. 31st, in the amount of $2,850,000, through the marketing of 150,000 shares of $5 par value, each being priced at $19. Issue was rapidly oversubscribed.

Abbott Laboratories has notified the S.E.C. that it has delayed its proposed security offering to Oct. 15th.

Directors of the N. J. Zinc declared a dividend on Sept. 29th of 50c on the common stock.

National Cylinder Gas, Chicago, which acquired a controlling interest in the Carbo-Oxygen Co. of Pittsburgh in July, plans to merge the two companies with the minority in Carbo-Oxygen being offered stock in National Cylinder Gas.

The Treasury Dept. has vacated its anti-dumping orders against sulfate from Poland, Germany, and Belgium as of Aug. 13, '32. New evidence, it is reported, has forced the conclusion that the findings were not justified.

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Chemical Stocks and Bonds

Sept. Last	1937 High	1937 Low	1936 High	1936 Low	1935 High	1935 Low	Sales	Stocks	Par $	Shares Listed	Dividends*	Earnings** $-per share-$ 1936	Earnings** $-per share-$ 1935
							Number of shares Sept. 1937	1937					
NEW YORK STOCK EXCHANGE													
65	80¼	60	86½	58	57½	35	23,700	195,400	Air Reduction	No	2,523,065	$2.50	2.79	2.10
196	258½	183	245	157	173	125	18,800	109,500	Allied Chem. & Dye	No	2,214,099	6.00	11.44	8.71
77	101½	72	89	49	57¾	41½	3,400	53,900	Amer. Agric. Chem.	No	210,934	2.50	4.71	6.37
17½	30¾	15½	35⅜	20½	35¾	22½	10,700	151,000	Amer. Com. Alcohol	20	260,947	.50	4.55	3.16
39½	46	38	50	37	52	36	4,300	42,300	Archer-Dan-Midland	No	549,546	3.00	3.20	3.46
56	94	56	84	48	48½	32¾	1,100	32,500	Atlas Powder Co.	No	248,660	3.50	4.21	2.81
115	133	113¾	131	112	115	106¼	160	3,680	5% conv. cum. pfd.	100	88,781	5.00	20.86	16.93
29⅜	41¼	26⅝	32¼	21¼	35⅜	19½	77,600	1,402,700	Celanese Corp. Amer.	No	1,000,000	1.50	2.25	1.99
104	115	104	116	106	111¼	97½	500	12,100	prior pfd.	100	164,818	7.00	27.25	35.34
13⅞	25¾	13¼	21¼	13	21	15⅛	40,400	624,600	Colgate-Palm.-Peet	No	1,956,086	.75	1.40	1.36
102⅝	104½	102	106½	100	107¼	101	1,400	14,000	6% pfd.	100	246,496	6.00	17.12	16.79
100	125¾	95	136½	94	101¼	67	5,600	38,900	Columbian Carbon	No	537,586	5.75	7.48	5.56
10⅞	21¼	10	24⅝	14¼	23⅞	16½	84,200	704,300	Commercial Solvents	No	2,635,371	.80	.84	1.02
60	71¼	54⅞	82½	63⅝	78⅜	60	19,600	214,500	Corn Products	25	2,530,000	3.75	3.86	2.62
161¼	171½	153	170	158	165	148¼	600	8,300	7% cum. pfd.	100	243,739	7.00	46.76	33.97
52	76⅛	52	63	42	50⅜	35½	1,000	16,300	Devoe & Rayn. A	No	95,000	2.00	4.49	2.89
111½	159¼	103	142¼	94⅛	105½	80½	5,500	32,900	Dow Chemical	No	945,000	2.40	4.48	3.43
144½	180⅛	136	184¾	133	146½	86⅝	39,300	314,400	DuPont de Nemours	20	11,049,470	6.10	7.56	5.04
133	135½	130¼	136½	129	132	126⅞	1,200	17,100	6% cum. deb.	100	1,092,699	6.00	84.21	56.81
175	198	151	185	156	172¼	110½	13,500	98,500	Eastman Kodak	No	2,250,921	6.75	8.24	6.90
158	163	150	166	152	164	141	160	3,140	6% cum. pfd.	100	61,657	6.00	306.64	258.09
25½	32¼	24¼	35⅝	23½	30⅝	17¼	20,100	242,400	Freeport Texas	10	796,380	1.00	2.43	1.78
106½	117	105⅛	135	108	125	112½	410	1,470	6% conv. pfd.	100	12,031	6.00	163.38	121.30
33½	51½	31½	55¼	39½	49½	23¾	17,200	196,800	Glidden Co.	No	603,304	2.00	3.29	2.91
45	58⅛	45	56	52¼			1,300	18,200	4½% cum. pfd.	50	200,000	2.25	15.43	.....
100	117½	99⅞	133	99⅝	119½	85	1,300	21,200	Hazel Atlas	25	434,409	7.64	6.56	7.58
128¼	185	123	5⅞	2⅞	90	71	6,300	25,900	Hercules Powder	No	583,672	5.44	6.33	4.23
128	135½	125	47¼	22¾	131	122	290	2,150	6% cum. pfd.	100	105,765	6.00	48.97	36.30
28⅛	47½	28	66⅜	43¼	36⅜	23½	18,800	342,400	Industrial Rayon	No	606,500	2.10	2.24	1.00
35	64¼	34	48¾	37	42¾	21½	1,200	8,800	Interchem.	No	288,358	2.75	3.02	2.74
100	111½	100	112	107	110	98½	60	2,050	6% pfd.	100	66,917	6.00	18.97	17.19
4	9⅛	3⅛	30	23	5	2½	45,100	637,600	Intern. Agricul.	No	436,049	None	—1.55	—.99
37½	63½	32	36¾	29¼	42¾	26	4,700	109,800	7% cum. pr. pfd.	100	100,000	None	.23	2.69
52	73⅜	49¾	80¼	47¼	47¼	22¼	288,800	1,696,300	Intern. Nickel	No	14,584,025	1.30	2.40	1.65
22	28¾	22	46½	32½	36¾	25	900	12,800	Intern. Salt	No	240,000	2.00	1.65	1.32
24	36	24	42⅜	27½	36¼	31	900	16,300	Kellogg (Spencer)	No	500,000	1.60	2.62	2.22
58½	79	54	103	79	49¼	21½	27,900	239,400	Libbey Owens Ford	No	2,503,168	3.50	4.15	3.26
21¼	26⅞	20	36½	26⅜	37¼	24½	16,500	118,100	Liquid Carbonic	No	684,812	.80	1.58	1.29
27½	41¾	27¼	171	155	33⅞	23¼	11,400	98,500	Mathieson Alkali	No	830,428	1.50	1.76	1.44
93	107½	85	147	137¾	94¾	55	7,500	91,800	Monsanto Chem.	10	1,114,409	3.00	4.01	3.84
31¾	44	29½	40	9	20⅝	14½	41,200	400,100	National Lead	10	3,095,100	.875	1.71	1.08
156	171	154¾	164	125	162½	150	200	5,200	7% cum. "A" pfd.	100	213,793	7.00	33.83	25.40
130	150	127	56	40¼	140½	121¾	240	1,750	6% cum. "B" pfd.	100	77,462	6.00	74.50	49.05
213¼	413¼	19	122½	115¾	10⅜	4⅜	47,600	714,800	Newport Industries	1	519,347	.60	.98	.57
88¼	103¾	80	13	5⅜	129	80	28,700	123,800	Owens-Illinois Glass	25	1,330,602	6.00	7.53	6.52
53	65½	49½	146	84	53¾	42¾	21,500	121,300	Procter & Gamble	No	6,410,000	1.87	2.39	2.32
118	118½	114½	135	126	121	115	660	3,900	5% pfd. (ser. 2-1-29)	100	171,569	5.00	94.14	88.15
9⅜	15⅜	8	41⅜	25⅝	8¾	4	28,300	397,200	Tenn. Corp.	5	853,696	.15	.47	.22
33	44	32	44¾	33	36¾	28¾	24,800	694,800	Texas Gulf Sulphur	No	2,540,000	2.50	.....	1.94
89	111	83¼	105¼	71⅝	75¾	44	73,300	434,300	Union Carbide & Carbon	No	8,903,138	2.30	4.09	3.06
69	91	69	96¼	68	78	46	7,300	68,000	United Carbon	No	397,877	4.05	5.54	4.71
26⅛	43⅝	23	59	31¼	50⅝	35⅛	12,300	82,300	U. S. Indus. Alco.	No	391,033	1.00	—.20	2.16
21½	39⅜	20⅛	30½	16¼	21¾	11¼	43,900	735,500	Vanadium Corp.-Amer.	No	366,637	None	.40	—1.13
5½	12¾	4¾	8½	4⅜	4⅜	2½	40,200	712,100	Virginia-Caro. Chem.	No	486,000	None	—2.56	—.79
37⅛	74⅜	33¼	58¼	28¼	35¾	17½	14,600	246,100	6% cum. part. pfd.	100	213,392	None	.16	4.20
17	27¼	17	32	19¾	25½	16¾	1,700	42,900	Westvaco Chlorine	No	284,962	.75	1.39	1.63
25⅞	34⅞	25½	35¼	31¾			1,600	29,400	Westvaco Chlorine, cum. pfd.	30	192,000	1.50	3.26	.....
NEW YORK CURB EXCHANGE														
28¼	37	25⅛	40¾	29¼	30	15	51,000	498,500	Amer. Cyanamid "B"	No	2,404,194	1.00	1.77	1.61
1½	2⅞	1½	3¾	2⅛	4	2	1,400	16,400	British Celanese Am. R.	10	2,806,000	None	—4.53	—.71
107½	124	107½	116¼	99¼	115	90	1,300	13,850	Celanese, 7% cum. 1st pfd.	100	148,179	7.00	24.47	21.96
7	15	7	16½	9	15	7	500	12,900	Celluloid Corp.	15	194,952	None	—.80	—.95
12½	14⅝	12½	15	11⅞	14½	11⅜	1,000	4,750	Courtaulds' Ltd.	1 £	24,000,000	7½%	8.40%	7.51%
6¾	10⅝	6¾	10¾	5	12½	6¼	3,500	59,000	Duval Texas Sulphur	No	500,000	.50	.61	.16
39	47½	39	55	39	58	37	1,200	12,600	Heyden Chem. Corp.	10	149,997	2.25	3.56	3.22
110	147½	105	140	98¼	97¼	46¾	6,200	56,400	Pittsburgh Plate Glass	25	2,142,443	6.00	7.15	5.32
106	154¾	102	154½	117	128⅞	84	4,750	44,000	Sherwin Williams	25	635,583	4.00	8.04	6.19
107¼	114	107¼	116	110	113½	106	280	2,630	5% pfd. cum.	100	155,521	5.00	41.44	33.17
PHILADELPHIA STOCK EXCHANGE														
149¼	179	149	179	114¼	116¾	76½	175	6,075	Pennsylvania Salt	50	150,000	8.50	10.59	7.74

Sept. Last	1937 High	1937 Low	1936 High	1936 Low	1935 High	1935 Low	Sales	Bonds	Date Due	Int. %	Int. Period	Out-standing $
NEW YORK STOCK EXCHANGE							Sept. 1937	1937				
105¼	109½	104¾	117½	107¾	116	104½	262,000	3,424,000	Amer. I. G. Chem. Conv. 5½'s	1949	5½ M. N.	29,929,000
30½	42½	29½	42½	27½	29¾	7⅜	206,000	1,963,000	Anglo Chilean Nitrate inc. deb.	1967	4½-5	12,433,000
100¾	102	100	102¾	96¾	100¼	91⅛	38,000	274,000	Int. Agric. Corp. 1st Coll. tr. stpd. to 1942	1942	5 M. N.	5,994,100
30½	35⅜	29¾	39	21	21½	7	388,000	2,990,000	Lautaro Nitrate conv. b's	1954	6 J. J.	31,357,000
28¾	28¾	20¾	35	23½	38	32½	.....	25,000	Ruhr Chem. 6's	1948	6 A. O.	3,136,000
103⅛	105	103	105	103	104	91½	36,000	264,000	Tenn. Corp. deb. 6's "B"	1944	6 M. S.	3,007,900
97	111	95⅛	98½	85¼	94¼	66	61,000	1,519,000	Vanadium Corp. conv. 5's	1941	5 A. A.	4,261,000

* Paid in 1936, including extras; ** For either fiscal or calendar years.

Industrial Trends

The expected acceleration in business activity after the Labor Day period failed to materialize in any substantial manner. Yet despite many adverse conditions and uncertainties business conditions are generally satisfactory. Although industrial activity, allowing for seasonal variations, has declined in each month since March, according to the Standard Statistics Co.'s index of production, September is estimated to show an increase of 7% over that of a year ago. Likewise, while the *N. Y. Times* Index of Business on Sept. 18th registered a decline for the 5th successive week it still shows up favorably when compared with corresponding period of last year except that in '36 the trend was upward while at the moment at least the opposite is true.

Chemical shipments naturally have not expanded seasonally as much as was earlier anticipated. A mixed situation exists in the process fields. Automotive activity reached the seasonal low peak in the last week of September, but a quick rebound is expected and a production of at least 1,000,000 units in the final quarter. The hoped-for post-Labor Day buying drive in steel has not taken place so far and it is now a question whether the August rate of 80-85% will be maintained throughout the final 3 months. Rayon production is still heavy, but cotton cloth producers are still scaling down output to prevent unwieldy surpluses from accumulating and silk and woolen mills are well below last spring's level of activity. Paper production is well maintained, paint sales are still slightly above last year's corresponding levels, tanning operations are spotty, glass production is satisfactory, and a fair final quarter will probably be the lot of the tire companies if automotive production holds up well. Building figures are not as pleasant reading as they might be and the withdrawal of government activity is quite noticeable.

Strange contradictions are readily apparent in the important indices of business. For example carloadings of 826,565 cars in the week of Sept. 18th reached the highest point in 7 years, an increase of 16.2% over the preceding week, 4.6% over the like week in '36, and 16.9% over the comparable '35 week. Electrical output continues to register new all-time records.

Reports of reduced manufacturing operations have generated excessive pessimism, particularly in financial circles. The lower prices for many raw materials have postponed forward buying on a major scale. Much depends upon the immediate trend of retail buying. Dun & Bradstreet estimates sales for the week ending Sept. 25th at from 3 to 7% ahead of the previous week, and 8 to 22% ahead of the corresponding week of last year. Wholesale trade is reported to be ahead by 10 to 25%. Spurred by consumer demands retailers are said to be revising their earlier estimates of fall buying and anticipate at least a 6% gain in dollar volume in October. The Bureau of Agricultural Economics estimates the farmers cash income is up for the first 8 months of the year about $681,000,000, a gain of about 15%. If the anticipated gains in retail trade this fall do materialize, stocks held both by retailers and jobbers will be cut markedly, and a substantial amount of buying that has been deferred will certainly develop, if prices hold firm. Lower prices stimulate consumer buying but they do not in most instances encourage accumulations of inventories by manufacturers.

A difference of opinion concerning the trend of fall and winter business exists among business purchasing executives, the most recent survey of the National Purchasing Association reveals, but in no instance is there evidence of extreme pessimism. A conservative buying program is advisable—this is the general consensus of the opinions expressed.

The country, at least the financial centers, suffered last month from a bad case of "nerves." The foreign situation is discouraging. The Spanish war drags on indefinitely with the ever-present danger that it may provide the spark for a major European conflict and Japan instead of winning a brilliant, short decisive victory over China is finding it difficult to subdue the unexpected stubborn resistance being offered by a united nation.

The chemical industry and allied groups entered the final quarter of the year with very few price changes or adjustments announced. While it is still quite early for '38 contract announcements it is expected that the general trend will be up. Labor costs have and will continue probably to rise and raw materials, despite the sudden weakness of the past few weeks, are higher than they were this time a year ago.

Statistics of Business

	August 1937	August 1936	July 1937	July 1936	June 1937	June 1936
General:						
Acceptances, outst'd'g *c*	$343	$308	$352	$315	$364	$316
Coal Prod., anthracite, tons	2,436,930	2,917,377	2,421,504	3,345,309	4,475,000	3,515,878
Coal Prod., bituminous, tons	33,665,000	33,086,000	31,912,000	32,005,000	31,726,000	33,523,000
Com. Paper, outst'd'g *c*	$329	$205	$324	$187	$284	$168
Failures, Dun & Bradstreet	707	655	618	639	670	773
Factory Payrolls, totals†	103.7	83.4	101.2	80.2	102.9	81.1
Factory Employment†	102.2	93.4	101.7	92.8	101.1	90.1
Merchandise Imports‡	.....	.....	.....	.....	$285,946	$285,038
Merchandise Exports‡	.....	.....	.....	.....	$265,363	$288,924
Manufacturing:						
Automotive Production	394,322	371,274	438,968	440,731	497,298	452,968
Boot & Shoe Production			34,623,669	35,678,092	34,240,868	29,370,504
Bldg. Contracts, Dodge*‡	$285,104	$275,281	$321,602	$294,735	$317,842	$232,665
Gasoline Prod., bbls.‡	.....	.....	.....	.....	47,273	41,540
Newsprint Production:						
Canada, tons	318,713	270,053	314,529	274,627	310,871	270,051
U. S., tons	80,311	73,673	78,205	73,361	78,500	79,830
Plate Glass Prod., sq. ft.	17,898,064	18,710,040	15,344,855	....	19,392,254	16,243,665
Steel Ingots Prod., tons	4,861,789	4,184,287	4,556,596	3,914,370	4,183,762	3,975,569
% Steel Activity	83.55	72.11	78.49	67.61	74.46	70.78
Pig Iron Prod., tons	3,605,818	2,711,721	3,498,858	2,594,268	3,107,506	2,586,240
U. S. Consumption, crude rubber, tons	41,456	46,777	.....	48,127	51,798	52,722
Tire Shipments	.....	.....	5,190,107	5,743,867	5,389,274	5,793,014
Tire Production	.....	.....	4,291,660	5,466,252	5,339,238	5,612,284
Tire Inventory	.....	.....	11,654,114	7,749,847	12,528,789	7,835,488
Cotton Consumption, bales	604,380	575,014	583,066	607,056	681,394	555,449
Cotton spindles operating	24,353,102	23,433,658	24,391,782	23,251,764	24,555,716	23,021,042
Rayon Prod., Ray. Org.	.....	.....	505	614	518	498
Chemical:						
Chemical Employment†*a*	137.1	123.0	139.5	122.5	138.5	118.6
Chemical Payrolls†*a*	156.1	117.7	153.9	114.9	153.5	113.3
Chemical Exports‡	.....	.....	.....	.....	$12,560	$9,087
Chemical Imports‡	.....	.....	.....	.....	$8,087	$5,814

Week Ending	Carloadings 1937	Carloadings 1936	Carloadings % of Change	Electrical Output§ 1937	Electrical Output§ 1936	Electrical Output§ % of Change	Jour. of Com. Price Index	Nat'l Fertilizer Ass'n Price Indices: Chem. & Drugs	Fats & Oils	Fert. Mat.	Mixed Fert.	All Groups	‡‡Labor Dept. Chem. & Drug Price Index	N.Y. Times Index Bus. Activity	% Steel Activity
Aug. 28	787,373	754,097	+ 4.4	2,294,713	2,125,502	+ 8.0	88.1	95.6	69.9	72.9	79.9	86.7	81.2	109.4	84.1
Sept. 4	804,633	765,131	+ 5.2	2,320,982	2,135,598	+ 8.6	88.5	95.6	69.5	72.8	79.9	85.9	81.0	109.5	71.6
Sept. 11	711,299	700,147	+ 1.6	2,154,276	2,098,924	+ 2.6	89.5	95.6	69.1	72.8	79.9	86.9	80.9	106.6	80.4
Sept. 18	826,565	711,299	+16.2	2,280,792	2,028,583	+12.4	90.4	95.6	70.7	72.6	80.4	87.6	81.2	104.9	76.1
Sept. 25	.....	.....	.....	2,265,748	2,170,807	+ 4.4	88.8	95.6	70.6	72.6	80.4	87.1	...	....	...

c 000,000 omitted, as end of month; * 37 states; † Dept. of Labor 3-year average, 1923-1925 = 100.0; ‡ 000 omitted; § K.W.H., 000 omitted; *a* Includes all allied products, but not petroleum refining; ‡‡ 1926-1928 = 100.0; *x* Dept. of Commerce; *y* Preliminary; *z* Revised.

Prices Current

Heavy Chemicals, Coal-tar Products, Dye-and-Tanstuffs, Colors and Pigments, Fillers and Sizes, Fertilizer and Insecticide Materials, Petroleum Solvents and Chemicals, Naval Stores, Fats and Oils, etc.

Chemical prices quoted are of American manufacturers for spot New York, immediate shipment, unless otherwise specified. Products sold f. o. b. works are specified as such. Import chemicals are so designated. Resale stocks when a market factor are quoted in addition to maker's prices and indicated "second hands."

Oils are quoted spot New York, ex-dock. Quotations f. o. b. mills, or for spot goods at the Pacific Coast are so designated.

Raw materials are quoted New York, f. o. b., or ex-dock. Materials sold f. o. b. works or delivered are so designated.

The current range is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both. Containers named are the original packages most commonly used.

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1936 Average $1.18 - Jan. 1937 $1.11 - August 1937 $1.09

	Current Market	1937 Low	1937 High	1936 Low	1936 High
Acetaldehyde, drs, c-l, wks lb.	...	.14	...	.14	...	.14
Acetaldol, 95%, 50 gal drs wks lb.	.21	.25	.21	.25	.21	.25
Acetamide, tech, lcl, kegs lb.	.32	.43	.32	.43	.38	.43
Acetanalid, tech, 150 lb bbls lb.	.24	.26	.24	.26	.24	.26
Acetic Anhydride, 100 lb cbys lb.	.20	.24	.20	.24	.21	.25
drs, f.o.b. wks, frt all'd lb.	.13	.15	.13	.15	...	.15
Acetin, tech, drs lb.	...	.33	.22	.33	.22	.24
Acetone, tks, f.o.b. wks, frt allowed lb.	...	.05	.05	.06½	.06	.11
drs, c-l, f.o.b. wks, frt all'd lb.	...	.06	.06	.07½	.07	.12
Acetyl chloride, 100 lb cbys lb.	.55	.68	.55	.68	.55	.68
ACIDS						
Abietic, kgs, bbls lb.	.09¾	.10	.06¾	.10	.06¾	.07
Acetic, 28%, 400 lb bbls, c-l, wks 100 lbs.	...	2.45	2.25	2.53	...	2.45
glacial, bbls, c-l, wks 100 lbs.	...	8.43	8.00	8.70	...	8.43
glacial, USP, bbls, c-l, wks 100 lbs.	...	10.25	10.50	12.43	...	12.43
Acetylsalicylic, USP, 225 lb bbls lb.	...	.55	.50	.55	...	...
Adipic, kgs, bbls lb.	...	.72	...	.72	...	.72
Anthranilic, ref'd, bbls lb.	.95	1.00	.85	1.00	.85	.95
tech, bbls lb.	...	.75	...	.75	...	.75
Battery, cbys, delv 100 lbs.	1.45	2.60	1.35	2.60	1.35	2.50
Benzoic, tech, 100 lb kgs lb.	.43	.47	.43	.47	.40	.45
USP, 100 lb kgs lb.	.54	.59	.54	.59	.54	.59
Boric, tech, gran, 80 tons, bgs, delv ton *a*	...	95.00	...	95.00	...	95.00
Broenner's, bbls lb.	...	1.11	...	1.11	1.11	1.25
Butyric, edible, c-l, wks, cbys lb.	1.20	1.30	1.20	1.30	1.20	1.30
synthetic, c-l, drs, wks lb.	...	.22	...	.22	...	.22
wks, lcl lb.	...	.23	...	.23	...	.23
tks, wks lb.	...	.21	...	.21	...	.21
Camphoric, drs lb.	5.50	5.70	5.50	5.70	...	5.25
Chicago, bbls lb.	...	2.10	...	2.10	...	2.10
Chlorosulfonic, 1500 lb drs, wks lb.	.03½	.05	.03½	.05	.03½	.05
Chromic, 99¾%, drs, delv lb.	.14¾	.16¾	.14¾	.16¾	.14¾	.16¾
Citric, USP, crys, 230 lb bbls lb. *b*	.25	.26	.25	.26	.25	.29
anhyd, gran, bbls lb. *b*	...	.27½	.27½	.29	.29	.31
Cleve's, 250 lb bbls lb.	.50	.52	.50	.52	.50	.54
Cresylic, 99%, straw, HB, drs, wks, frt equal gal.	.89	.91	.72	.91	.51	.74
99%, straw, LB, drs, wks, frt equal gal.	.92	.94	.77	.94	.68	.79
resin grade, drs, wks, frt equal lb.	.10¾	.11¼	.09	.11¼	.52*y*	.65*y*
Crotonic, drs lb.	.75	1.00	.75	1.00	.90	1.00
Formic, tech, 140 lb drs lb.	.11	.13	.11	.13	.11	.13
Fumaric, bbls lb.	...	.60	...	.60	...	.60
Fuming, see Sulfuric (Oleum)						
Gallic, tech, bbls lb.	.75	.79	.65	.75	.65	.68
USP, bbls lb.	.87	.91	.77	.91	.70	.80
Gamma, 225 lb bbls, wks lb.	...	.85	...	.85	.80	.85
H, 225 lb bbls, wks lb.	.50	.55	.50	.55	.50	.55
Hydriodic, USP, 10% sol. cbys lb.	.50	.51	.50	.51	.50	.51
Hydrobromic, 34% com 155 lb cbys, wks lb.	.42	.44	.40	.42	...	...
Hydrochloric, see muriatic.						
Hydrocyanic, cyl, wks lb.	.80	1.30	.80	1.30	.80	1.30
Hydrofluoric, 30%, 400 lb bbls, wks lb.	.07	.07½	.07	.07½	.07	.07½
Hydrofluosilicic, 35%, 400 bbls, wks lb.	.10½	.15	.10½	.15	.11	.12
Lactic, 22%, dark, 500 lb bbls lb.	.02½	.02¾	.02½	.02¾	.02½	.05
22%, light ref'd, bbls lb.	.03½	.03¾	.03½	.03¾	.03½	.07
44%, light, 500 lb bbls lb.	.05½	.05¾	.05½	.05¾	.05½	.12
44%, dark, 500 lb bbls lb.	.06½	.06¾	.06½	.06¾	.06½	.10
50%, water white, 500 lb bbls lb.	.10½	.11½	.10½	.11½	.10½	.14½
USP X, 85%, cbys lb.	.42	.45	.42	.50	.45	.50
Laurent's, 250 lb bbls lb.	.45	.46	.45	.46	.45	.47
Linoleic, bbls lb.	...	.20	.16	.20	.16	.16
Maleic, powd, kgs lb.	.30	.40	.29	.40	.29	.32
Malic, powd, kgs lb.	.45	.60	.45	.60	.45	.60
Metanillic, 250 lb bbls lb.	.60	.65	.60	.65	.60	.65
Mixed, tks, wks N unit	.06½	.07¼	.06½	.07¼	.06½	.07¼
S unit	.008	.009	.008	.009	.008	.009
Monochloracetic, tech, bbls lb.	.16	.18	.16	.18	.16	.18
Monosulfonic, bbls lb.	1.50	1.60	1.50	1.60	1.50	1.60
Muriatic, 18°, 120 lb cbys, c-l, wks 100 lb.	...	1.50	1.35	1.50	...	1.35
tks, wks 100 lb.	...	1.00	...	1.00	...	1.00
Muriatic (continued):						
20°, cbys, c-l, wks 100 lb.	...	1.75	1.45	1.75	...	1.45
tks, wks 100 lb.	...	1.10	...	1.10	1.10	1.20
22°, cbys, wks 100 lb.	...	2.25	1.95	2.25	...	1.95
tks, wks 100 lb.	...	1.60	...	1.60	...	1.60
CP, cbys lb.	.06½	.07⅛	.06½	.07⅛	.06½	.07⅛
N & W, 250 lb bbls lb.	.85	.87	.85	.87	.85	.87
Naphthenic, 240-280 s.v., drs lb.	.10	.13	.10	.14	.11	.14
Sludges, drs lb.	...	.05	.05	.10	.06	.10
Naphthionic, tech, 250 lb bbls lb.	.60	.65	.60	.65	.60	.65
Nitric, 36°, 135 lb cbys, c-l, wks 100 lb. *c*	...	5.00	...	5.00	...	5.00
38°, c-l, cbys, wks 100 lb. *c*	...	5.50	...	5.50	...	5.50
40°, cbys, c-l, wks 100 lb. *c*	...	6.00	...	6.00	...	6.00
42°, c-l, cbys, wks 100 lb. *c*	...	6.50	...	6.50	...	6.50
CP, cbys, delv lb.	.11½	.12½	.11½	.12½	.11½	.12½
Oxalic, 300 lb bbls, wks, or N. Y. lb.	.10¾	.12	.10¾	.12	.10¾	.12½
Phosphoric, 50%, USP, cbys lb.	.12	.14	.12	.14	.14	.14
50%, acid, c-l, drs, wks lb.	.06	.08	.06	.08	.06	.08
75%, acid, c-l, drs, wks lb.	.09	.10½	.09	.10½	.09	.10½
Picramic, 300 lb bbls, wks lb.	.65	.70	.65	.70	.65	.70
Picric, kgs, wks lb.	.35	.40	.35	.40	.30	.40
Propionic, 98% wks, drs lb.	...	.22	.20	.22	...	.35
80% lb.	.16	.17½	.16	.17½	.15	.17½
Pyrogallic, tech, lump, pwd, bbls lb.	...	1.05	...	...	...	...
cryst, USP lb.	1.45	1.63	1.30	1.48	...	...
Ricinoleic, bbls lb.	...	.38	.35	.38	...	...
Salicylic, tech, 125 lb bbls, wks lb.	...	.33	...	.33	...	.40
Sebacic, tech, drs, wks lb.	.37	.41	.37	.41	...	...
Succinic, bbls lb.	...	.75	...	.75	...	.75
Sulfanilic, 250 lb bbls, wks lb.	.17	.18	.17	.18	.17	.19
Sulfuric, 60°, tks, wks ton	...	12.00	...	12.00	11.00	12.00
c-l, cbys, wks 100 lb.	...	1.25	1.10	1.25	...	1.10
66°, tks, wks ton	...	15.50	...	15.50	...	15.50
c-l, cbys, wks 100 lb.	...	1.35	...	1.35	...	1.35
CP, cbys, wks lb.	.06½	.07½	.06½	.07½	.06½	.07½
Fuming (Oleum) 20% tks, wks ton	...	18.50	...	18.50	...	18.50
Tannic, tech, 300 lb bbls lb	.40	.47	.19	.47	.19	.40
Tartaric, USP, gran, powd, 300 lb bbls lb.	.24¾	.25¼	.21¾	.25¼	.22¾	.24
Tobias, 250 lb bbls lb.	.65	.67	.65	.67	.65	.72½
Trichloroacetic bottles lb.	2.00	2.50	2.00	2.50	2.45	2.75
kgs lb.	...	1.75	...	1.75	...	1.75
Tungstic, tech, bbls lb.	...	2.75	2.50	2.75	1.50	1.60
Vanadic, drs, wks lb.	1.10	1.20	1.10	1.20	1.10	1.20
Albumen, light flake, 225 lb bbls lb.	.52	.60	.47	.60	.50	.60
dark, bbls lb.	.11	.15	.11	.17	.12	.17
egg, edible lb.	...	1.05	.76	1.05	.77	1.05
vegetable, edible lb.	.74	.78	.76	.78	.65	.70
ALCOHOLS						
Alcohol, Amyl (from Pentane) tks, delv lb.	...	.123	...	.123	.123	.143
c-l, drs, delv lb.	...	.133	...	.133	.133	.150
lcl, drs, delv lb.	...	.143	...	.143	.143	.157
Amyl, secondary, tks, delv lb.	...	.08½	...	.08½	.08½	.108
Benzyl, cans lb.	.70	1.10	.65	1.10	.65	1.10
Butyl, normal, tks, f.o.b. wks, frt allowed lb. *d*	...	.09	.08½	.09	.08½	.11
c-l, drs, f.o.b. wks, frt allowed lb. *d*	...	.10	.09½	.10	.09½	.12
Butyl, secondary, tks, delv lb. *d*	...	.07	...	.07	.07	.096
c-l, drs, delv lb. *d*	...	.08	...	.08	.08	.106
Capryl, drs, tech, wks lb.	...	.85	...	.85	...	.85
Cinnamic, bottles lb.	2.50	3.65	2.50	3.65	2.50	3.65
Denatured, CD, No. 1*, 12, 13, c-l, drs, wks gal. *e*	...	.35	.33	.35	.30	.44*
Western schedule, c-l, wks gal. *e*	...	.28	.37	.39	.39	.52*
Denatured, SD, No. 1, tks	...	.27	.26	.27	.23	.28
c-l, drs, wks gal. *e*	...	.33	.32	.33	.29	.34
Diacetone, tech, tks, delv lb. *f*	...	.11½	...	.11½	...	.16
c-l, drs, delv lb. *f*	...	.12½	...	.12½	...	.17
Ethyl, 190 proof, molasses, tks gal. *g*	...	4.06	4.05	4.07	4.07	4.10
c-l, drs gal. *g*	...	4.12	4.11	4.12	4.11	4.27
c-l, bbls gal. *g*	...	4.13	4.12	4.13	4.12	4.28
absolute, drs gal. *g*	4.54	6.08½	4.54	6.08½	4.54	6.11½

a Powdered boric acid $5 a ton higher in each case; USP $15 higher; *b* Powdered citric is ½c higher; kegs are in each case ½c higher than bbls. *y* Price given is per gal.

c Yellow grades 25c per 100 lbs. less in each case; *d* Spot prices are 1c higher; *e* Anhydrous is 5c higher in each case; *f* Pure prices are 1c higher in each case; *k* Fisher Index discontinued.

ABBREVIATIONS—Anhydrous, anhyd; bags, bgs; barrels, bbls; carboys, cbys; carlots, c-l; less-than-carlots, lcl; drums, drs; kegs, kgs; powdered, powd; refined, ref'd; tanks, tks; works, f.o.b., wks.

		Current Market	1937 Low	1937 High	1936 Low	1936 High
Alcohols (continued)						
Furfuryl, tech, 500 lb drs	lb.	.30	.35	.30	.35	.35
Hexyl, secondary tks, delv	lb.	...	.12	.11½	.12	... .11½
c-l, drs, delv	lb.	...	.13	.12½	.13	... .12½
Normal, drs, wks	lb.	3.25	3.50	3.25	3.50	3.25 3.50
Isoamyl, prim, cans, wks	lb.	...	.32	...	.32	... .32
drs, lcl, delvd	lb.	...	.27	...	.27	... .27
Isobutyl, ref'd, lcl, drs	lb.	...	.10	...	.10	.10 .12
c-l, drs	lb.	...	.09½	...	.09½	.09½ .11½
tks	lb.	...	.08½	...	.08½	.08½ .10½
Isopropyl, refd, c-l, drs, f.o.b. wks, frt allowed	lb.	...	.39½	.39½	.45	.45 .55
Propyl, norm, 50 gal drs	gal.	...	.75		.75	... .75
Special Solvent, tks, wks	gal.	...	.28	.27	.28	.24 .32
Aldehyde ammonia, 100 gal drs	lb.	.80	.82	.80	.82	.80 .82
Alphanaphthol, crude, 300 lb bbls	lb.	..	.52	...	.52	.52 .65
Alphanaphthylamine, 350 lb bbls	lb.	.32	.34	.32	.34	.32 .34
Alum, ammonia, lump, c-l, bbls, wks	100 lb.	...	3.25	3.00	3.25	... 3.00
delv NY., Phila	100 lb.	...	3.40	3.15	3.40	... 3.15
less than 25 bbls, wks	100 lb.	...	3.50	3.25	3.50	... 3.25
Granular, c-l, bbls. wks	100 lb.	...	3.00	2.75	3.00	... 2.75
Powd, c-l, bbls, wks	100 lb.	...	3.40	3.15	3.40	... 3.15
Chrome, bbls	100 lb.	7.00	7.25	7.00	7.25	7.00 7.25
Potash, lump, c-l, bbls, wks	100 lb.	...	3.50	3.25	3.50	... 3.25
25 bbls or more, wks	100 lb.	...	3.75	3.40	3.75	... 3.40
Granular, c-l, bbls, wks	100 lb.	...	3.25	3.00	3.25	... 3.40
25 bbls or more, bbls, wks	100 lb.	...	3.50	3.25	3.50	... 3.00
Powd, c-l, bbls, wks	100 lb.	...	3.65	3.40	3.65	... 3.40
25 bbls or more, wks	100 lb.	...	3.90	3.55	3.90	... 3.55
Soda, bbls, wks	100 lb.	...	3.25		3.25	
Aluminum metal, c-l, NY	100 lb.	...	20.00	19.00	20.00	19.00 20.00
Acetate, CP, 20%, bbls	lb.	.09	.10	.09	.10	.09 .10
Chloride anhyd, 99%, wks	lb.	.07	.12	.07	.12	.07 .12
93%, wks	lb.	.05	.08	.05	.08	.05 .08
Crystals, c-l, drs, wks	lb.	.06	.06¼	.06	.06¼	.06 .07
Solution, drs, wks	lb.	.02¾	.03¼	.02¾	.03¼	.02¾ .03½
Hydrate, 96%, light, 90 lb bbls, delv	lb.	.13	.15	.13	.15	.13 .15
heavy, bbls, wks	lb.	.029	.03½	.029	.03½	.029 .04½
Oleate, drs	lb.	.16¾	.18½	.16¾	.18½	.15¾ .18½
Palmitate, bbls	lb.	.22	.23	.22	.23	.21 .22
Resinate, pp., bbls	lb.	...	.15	...	.15	... .15
Stearate, 100 lb bbls	lb.	.19	.21	.19	.21	.18 .21
Sulfate, com, c-l, bgs, wks	100 lb.	...	1.35	...	1.35	... 1.35
c-l, bbls, wks	100 lb.	...	1.55	...	1.55	... 1.55
Sulfate, iron-free, c-l, bgs, wks	100 lb.	...	1.90	...	1.90	... 1.90
c-l, bbls, wks	100 lb.	...	2.05	...	2.05	... 2.05
Aminoazobenzene, 110 lb kgs	lb.	...	1.15	...	1.15	... 1.15
Ammonia anhyd com, tks	lb.	.04½	.05½	.04½	.05½	.04½ .05½
Ammonia anhyd, 100 lb cyl	lb.	.16	.22	.16	.22	.15¼ .22
26°, 800 lb drs, delv	lb.	.02¼	.02½	.02¼	.02½	.02¼ .03
Aqua 26°, tks, NH	cont.	...	.05	.04½	.05	.04½ .05
tk wagon	lb.	...	.02	...	.02	.02 .024
Ammonium Acetate, kgs	lb.	.26	.33	.26	.33	.26 .33
Bicarbonate, bbls, f.o.b. wks	100 lb.	5.15	5.71	5.15	5.71	5.15 5.71
Bifluoride, 300 lb bbls	lb.	.16	.17	.16	.17	.15 .17
carbonate, tech, 500 lb bbls	lb.	.08	.12	.08	.12	.08 .12
Chloride, White, 100 lb bbls, wks	100 lb.	4.45	4.90	4.45	4.90	4.45 4.90
Gray, 250 lb bbls, wks	100 lb.	5.50	6.25	5.00	6.25	5.00 5.75
Lump, 500 lbs cks spot	lb.	.10½	.11	.10½	.11	.10½ .11
Lactate, 500 lb bbls	lb.	.15	.16	.15	.16	.15 .16
Laurate, bbls	lb.	...	.23	...	...	... ...
Linoleate	lb.	...	.15	.11	.15	.11 .12
Naphthenate, bbls	lb.	...	.17	...	...	... ...
Nitrate, tech, cks	lb.	.03¾	.04	.03¾	.04	.04 .05
Oleate, drs	lb.	...	.15	.15	.10	... .10
Oxalate, neut, cryst, powd, bbls	lb.	...	.22½	.22½	.23	.26 .27
pure, cryst, bbls, kgs	lb.	.27	.28	.27	.28	.27 .28
Perchlorate, kgs	lb.	...	.16	...	.16	... .16
Persulfate, 112 lb kgs	lb.	.21	.24	.21	.24	.21 .25
Phosphate, dibasic tech, powd, 325 lb bbls	lb.	.07½	.10	.07½	.10	.07½ .10
Ricinoleate, bbls	lb.	...	.15	...	...	... ...
Stearate, anhyd, bbls	lb.	...	.24	...	...	... ...
Paste, bbls	lb.	...	.07½	...	...	... ...
Sulfate, dom, f.o.b., bulk	ton	...	27.50	26.00	27.00	22.00 26.00
200 lb bgs	ton	...	28.80	...	28.80	... ...
100 lb bgs	lb.	...	29.50	...	29.50	... ...
Sulfocyanide, kgs	lb.	...	.55	...	.55	... .55
Amyl Acetate (from pentane) tks, delv	lb.	...	.11½	...	.11½	.11½ .13½
tech, drs, delv	lb.	.11½	.12	.11½	.13½	.12½ .149
Secondary, tks, delv	lb.	...	.08½	...	.08½	... .108
c-l, drs, delv	lb.	...	.09½	...	.09½	.118 .123
Chloride, norm, drs, wks	lb.	.56	.68	.56	.68	.56 .68
mixed, drs, wks	lb.	.07	.077	.07	.077	.07 .077
tks, wks	lb.	...	.06	...	.06	... .06
Mercaptan, drs, wks	lb.	...	1.10	...	1.10	... 1.10
Oleate, lcl, wks, drs	lb.	...	.25	...	.25	... ...
Stearate, lcl, wks, drs	lb.	...	.26	...	.26	... ...

g Grain alcohol 20c a gal. higher in each case.

		Current Market	1937 Low	1937 High	1936 Low	1936 High
Amylene, drs, wks	lb.	.102	.11	.102	.11	.102 .11
tks, wks	lb.	...	.09	...	.09	... .09
Aniline Oil, 960 lb drs and tks	lb.	.15	.17½	.15	.17½	.15 .17½
Annatto fine	lb.	.34	.37	.34	.37	.34 .37
Anthracene, 80%	lb.	...	.75	...	.75	... .75
40%	lb.	...	.18	...	.18	... .18
Anthraquinone, sublimed, 125 lb bbls	lb.	...	.65	.50	.65	.50 .52
Antimony metal slabs, ton lots	lb.	...	.15¾	.13⅝	.17	.11⅜ .14
Butter of, see Chloride.						
Chloride, soln cbys	lb.	...	.17	...	.17	.13 .17
Needle, powd, bbls	lb.	.14	.16	.14	.19½	.11 .12½
Oxide, 500 lb bbls	lb.	.15½	.16½	.14¼	.16½	.12¾ .14
Salt, 63% to 65%, tins	lb.	.23¾	.24	.22	.24	.22 .24
Sulfuret, golden, bbls	lb.	.22	.23	.22	.23	.22 .23
Archil, conc, 600 lb bbls	lb.	.21	.27	.21	.27	.21 .27
Double, 600 lb bbls	lb.	.18	.20	.18	.20	.18 .20
Aroclors, wks	lb.	.18	.30	.18	.30	.18 .30
Arrowroot, bbl	lb.	.08½	.09	.08½	.09¾	.08¾ .09¾
Arsenic, Metal	lb.	.42	.44	.42	.44	.40 .44
Red, 224 lb cs kgs	lb.	...	.15¾	...	.15¾	... .15¾
White, 112 lb kgs	lb.	.03	.04	.03	.04	.03 .04½
Barium Carbonate precip, 200 lb bgs, wks	ton	52.50	62.50	52.50	62.50	56.50 61.00
Nat (witherite) 90% gr, c-l, wks, bgs	ton	...	44.00	42.00	45.00	42.00 45.00
Chlorate, 112 lb kgs, N Y	lb.	.16½	.17½	.16½	.17½	.15½ .17½
Chloride, 600 lb bbls, wks	ton	72.00	74.00	72.00	74.00	72.00 74.00
Dioxide, 88%, 690 lb drs	lb.	.11	.12	.11	.12	.11 .12
Hydrate, 500 lb bbls	lb.	.04¾	.05½	.04¾	.05½	.05¼ .06
Nitrate, bbls	lb.	.07	.08¼	.07	.08¼	.07 .08¼
Barytes, floated, 350 lb bbls wks	ton	...	23.65	23.65	23.65	23.65 23.65
Bauxite, bulk, mines	ton	7.00	10.00	7.00	10.00	7.00 10.00
Bentonite, c-l, No. 1, bgs, wks	ton	...	16.00	...	16.00	... 16.50
No. 2	ton	...	11.00	...	11.00	... 11.00
Benzaldehyde, tech, 945 lb drs, wks	lb.	.60	.62	.60	.62	.60 .62
Benzene (Benzol), 90%, Ind, 8000 gal tks, frt allowed	gal.	...	.16	...	.16	.16 .18
90% c-l, drs	gal.	...	.21	...	.21	... .23
Ind pure, tks, frt allowed	gal.	...	.16	...	.16	.16 .18
Benzidine Base, dry, 250 lb bbls	lb.	.70	.72	.70	.72	.70 .74
Benzoyl Chloride, 500 lb drs	lb.	.40	.45	.40	.45	.40 .45
Benzyl Chloride, tech, drs	lb.	.30	.40	.30	.40	.30 .40
Beta-Naphthol, 250 lb bbl, wks	lb.	.23	.24	.23	.24	.24 .27
Naphthylamine, sublimed, 200 lb bbls	lb.	1.25	1.35	1.25	1.35	1.25 1.35
Tech, 200 lb bbls	lb.	.51	.52	.51	.52	.51 .55
Bismuth metal	lb.	1.00	1.10	1.00	1.10	1.00 1.10
Chloride, boxes	lb.	3.20	3.25	3.20	3.25	3.20 3.25
Hydroxide, boxes	lb.	3.15	3.20	3.15	3.20	3.15 3.20
Oxychloride, boxes	lb.	...	2.95	2.75	3.04	2.95 3.00
Subbenzoate, boxes	lb.	3.25	3.30	3.25	3.30	3.25 3.30
Subcarbonate, kgs	lb.	1.23	1.58	1.23	1.58	1.40 1.45
Trioxide, powd, boxes	lb.	...	3.57	3.45	3.57	3.45 3.50
Subnitrate	lb.	1.22	1.48	1.22	1.48	1.30 1.35
Blackstrap, cane (see Molasses, Blackstrap).						
Blanc Fixe, 400 lb bbls, wks	ton *h*	40.00	75.00	40.00	75.00	42.50 70.00
Bleaching Powder, 800 lb drs, c-l, wks, contract	100 lb.	...	2.00	...	2.00	... 2.00
lcl, drs, wks	lb.	2.25	3.60	2.25	3.60	2.25 3.60
Blood, dried, f.o.b., NY	unit	...	3.50	3.50	4.30	2.50 4.25
Chicago, high grade	unit	...	3.50	3.15	4.65	2.90 4.50
Imported shipt	unit	...	3.45	3.40	4.10	2.60 3.75
Blues, Bronze Chinese Milori	lb.	.36	.37	.36	.37	.37 .38½
Prussian Soluble	lb.	...	.10	...	.10	... .10
Ultramarine,* dry, wks, bbls	lb.	...	.15	...	.15	... .15
Regular grade, group 1	lb.	...	.18	...	.18	... .18
Special, group 1	lb.	...	.26	...	.26	... .26
Pulp, No. 1	lb.	...	.26	...	.26	... .26
Bone, 4½ + 50% raw, Chicago	ton	29.00	30.00	26.00	28.00	20.00 25.00
Bone Ash, 100 lb kgs	lb.	.06	.07	.06	.07	.06 .07
Black, 200 lb bbls	lb.	.06½	.08¼	.05½	.08¼	.05½ .08¼
Meal, 3% & 50%, imp	ton	...	26.00	25.00	27.50	23.00 26.00
Domestic, bgs, Chicago	ton	22.00	24.00	19.00	27.00	16.00 20.00

BORAX

Borax, tech, gran, 80 ton lots, sacks, delv	ton *i*	...	42.00	40.00	42.00	... 40.00
bbls, delv	ton *i*	...	52.00	50.00	52.00	... 50.00
Tech, powd, 80 ton lots, sacks	ton *i*	...	47.00	45.00	47.00	... 45.00
bbls, delv	ton *i*	...	57.00	56.00	57.00	... 56.00
Bordeaux Mixture, consumers, East, c-l, tins, drs, cases	lb.	.10½	.11	.10½	.11	.08 .16
Dealers, East, c-l	lb.	.10	.10½	.10	.10½	.08½ .16½

h Lowest price is for pulp, highest for high grade precipitated; *i* Crystals $6 per ton higher; USP, $15 higher in each case; * Freight is equalized in each case with nearest producing point.

Here's the Waterproof Duck about to start quacking,
Listen to him—he's an expert on packing.

• • •

If you had to shiver in the snow and rain,
If you had to ride on a rickety train,

If you were jostled and jarred in a truck,
And slid in the mud and dumped in the muck,

If you were cracked—as I hope you're not—
And your contents spilled all over the lot,

If you had to sit in a cold, damp cellar,
Instead of being the buyer or seller,

If you were your product instead of the boss,
You'd want to be packed to avoid all loss.

You'd get a Bemis Waterproof Bag—

A bag that is proof against water and moisture,
And you'd be as snug as a pearl in an oyster.

For a Bemis Waterproof Bag is stout—
Nothing gets in and nothing gets out.

You'd find upon close examination
You traveled safe to your destination.

With your trademark tattooed right on your chest,
The buyer that got you would rank you the best.

• • •

Let us show you how Bemis *Waterproof* Bags can reduce your packing and shipping costs and give your products complete "en route" protection. Write today for information and sample bag.

BEMIS BRO. BAG CO.
407 South Fourth St., St. Louis, Mo.
5104 Second Ave., Brooklyn, N.Y.

Bromine
Chromium Fluoride

Prices

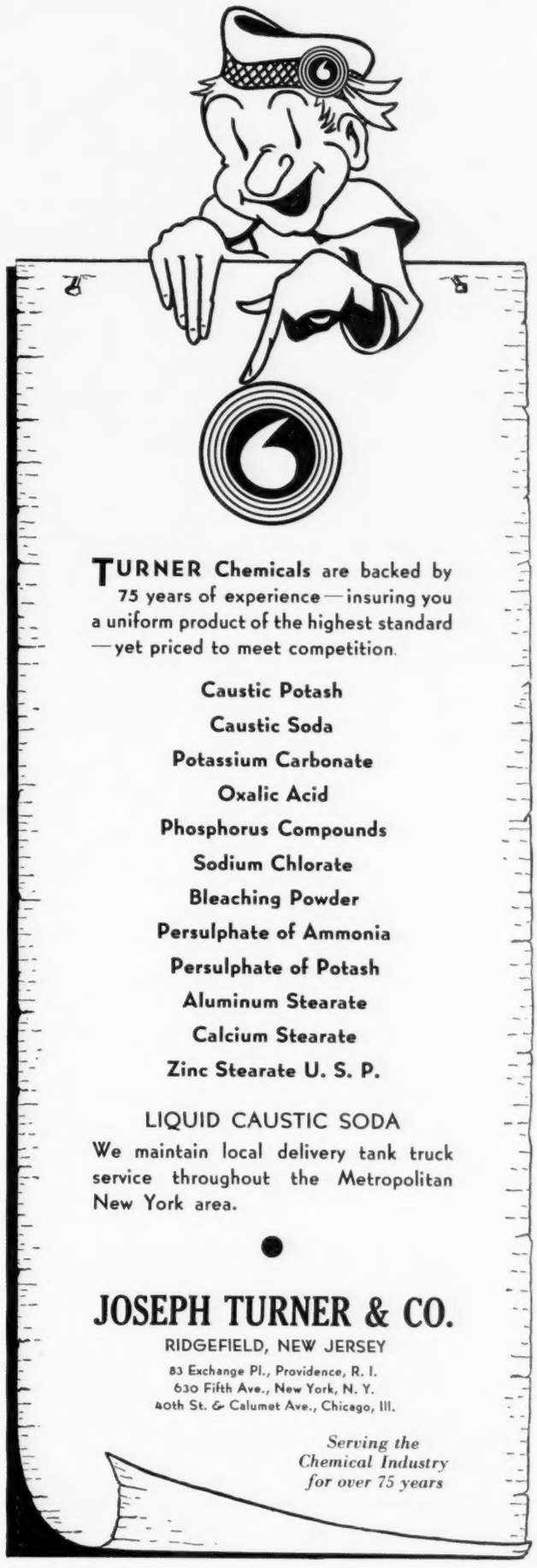
	Current Market		1937 Low	1937 High	1936 Low	1936 High
Bromine, cases .....lb.	.30	.43	.30	.43	.30	.43
Bronze, Al, pwd, 300 lb drs lb.	.90½	.92½	.80	1.50	.80	1.50
Gold, blk .....lb.	.45	.65	.40	.65	.40	.55
Butanes, com 16-32° group 3 tks .....lb.	.02¼	.03¾	.02¼	.03¾	...	.04
Butyl, Acetate, norm drs, frt allowed .....lb.	.10	.10½	.10	.10½	.09½	.12½
tks, frt allowed .....lb.	...	.09	...	.09	.08½	.11
Secondary, tks, frt allowed .....lb.	...	.07	.07	.07½	.07½	.096
drs, frt, allowed .....lb.	.08	.08½	.08	.09	.106	.111
Aldehyde, 50 gal drs, wks .....lb.	...	.17½	.16½	.17½	.19	.21
Carbinol, norm drs, wks lb.	.60	.75	.60	.75	.60	.75
Lactate .....lb.	.22½	.23½	.22½	.23½	.22½	.23½
Oleate, drs, frt allowed..lb.	...	.25	...	.25	...	...
Propionate, drs .....lb.	.18	.18½	.18	.18½	.18	.18¾
tks, delv .....lb.	...	.17	.	.17	...	.17
Stearate, 50 gal drs ....lb.	...	.26	.25	.26	...	.26
Tartrate, drs .....lb.	.55	.60	.55	.60	.55	.60
Butyraldehyde, drs, lcl, wks lb.		.35½		.35½		
Cadmium Metal .. ..lb.	1.60	nom.	1.05	1.60	.75	1.05
Sulfide, orange, boxes...lb.	1.50	1.60	.90	1.60	.90	1.10
CALCIUM						
Calcium, Acetate, 150 lb bgs c-l, delv .....100 lb.	...	2.10	2.10	2.25	...	2.10
Arsenate, jobbers, East of Rocky Mts, drs .....lb.	.06¼	.06⅜	.06	.06⅜	.06	.06⅜
dealers, drs .....lb.	.06¾	.07¾	.06¼	.07¾	.06¼	.07¾
South, dealers, drs ...lb.	.06½	.06¾	.06½	.06¾	.06½	.06¾
Carbide, drs .....lb.	.05	.06	.05	.06	.05	.06
Carbonate, tech, 100 lb bgs c-l .....lb.	1.00	1.00	1.00	1.00	1.00	1.00
Chloride, flake, 375 lb drs, c-l, delv .....ton	...	22.00	...	22.00	...	22.00
Solid, 650 lb drs, c-l, delv .....ton	...	20.00	...	20.00	...	20.00
Ferrocyanide, 350 lb bbls wks .....lb.	...	.17	...	.17	...	.17
Gluconate, Pharm, 125 lb bbls .....lb.	.50	.57	.50	.57	.50	.57
Nitrate, 100 lb bgs ....ton	...	26.10	...	26.10	...	26.50
Palmitate, bbls .....lb.	.22	.23	.22	.23	.21	.22
Phosphate, tech, 450 lb bbls .....lb.	.06½	.07½	.06½	.07½	.07½	.08
Resinate, precip, bbls ...lb.	.13	.14	.13	.14	.13	.14
Stearate, 100 lb bbls ...lb.	.19	.21	.19	.21	.18	.21
Camphor, slabs .....lb.	.54	.55	.54	.55	.50	.56
Powder .....lb.	.54	.55	.54	.55	.4940	.56
Camwood, Bk, ground bbls lb.	.16	.18	.16	.18	.16	.18
Carbon Bisulfide, 500 lb drs lb.	.05	.05¾	.05	.05¾	.05¼	.08
Black, c-l, bgs, delv, price varying with zone ....lb.	.0445	.0535	.0445	.0535	.0445	.0535
lcl, bgs, delv, all zones lb.	...	.07	...	.07	...	.07
cartons, delv .....lb.	...	.07¾	...	.07¾	...	.07¾
cases, delv .....lb.	...	.08¼	...	.08¼	...	.08¼
Decolorizing, drs, c-l ...lb.	.08	.15	.08	.15	.08	.15
Dioxide, Liq 20-25 lb cyl lb.	.06	.08	.06	.08	.06	.08
Tetrachloride, 1400 lb drs, delv .....lb.	.05¼	.06	.05¼	.06	.05¼	.06
Casein, Standard, Dom, grd lb.	.13	.14	.13	.20¾	.14½	.20¾
80-100 mesh, c-l, bgs....lb.	.13½	.14½	.13½	.21¼	.15	.21¼
Castor Pomace, 5½ NH_3, c-l, bgs, wks .....ton	...	23.00	23.00	25.00	15.00	20.00
Imported, ship, bgs ....ton	...	nom.	...	nom.	17.00	18.00
Celluloid, Scraps, ivory cs lb.	.12	.15	.12	.15	.17	.18
Transparent, cs .....lb.	.12	.13	.12	.13	...	.20
Cellulose, Acetate, 50 lb kgs .....lb.	...	.40	.40	.55	.55	.60
Chalk, dropped, 175 lb bbls lb.	.03	.03¾	.03	.03¾	.03	.03¾
Precip, heavy, 560 lb cks lb.	.03	.04	.03	.04	.03	.04
Light, 250 lb cks .....lb.	.03¼	.04	.03	.04	.03	.04
Charcoal, Hardwood, lump, blk, wks .....bu.	....	.15	....	.15	....	.15
Softwood, bgs, delv* ....ton	23.00	34.00	23.00	34.40	23.00	34.00
Willow, powd, 100 lb bbl, wks .....lb.	.06	.07	.06	.07	.06	.06¼
Chestnut, clarified, tks, wks lb.	...	.02125	.01625	.02125	.01625	.01⅞
25%, bbls, wks .....lb.	...	.0225	.02	.0225	.01½	.02
Pwd, 60%, 100 lb bgs, wks .....lb.	...	.04⅞	...	.04⅞	...	.04⅞
China Clay, c-l, blk mines ton	....	6.50	....	6.50	....	7.00
Imported, lump, blk ...ton	22.00	25.00	22.00	25.00	15.00	25.00
Chlorine, cyls, lcl, wks, contract .....lb.	.07½	.08½	.07½	.08½	.07½	.08½
cyls, c-l, contract ...lb. *j*	...	.05½	...	.05½	...	.05½
Liq, tk, wks, contract 100 lb.	...	2.15	...	2.15	...	2.15
Multi, c-l, cyls, wks, cont .....lb.	2.30	2.55	2.30	2.55	2.30	2.55
Chloroacetophenone, tins, wks .....lb.	3.00	3.50	3.00	3.50	...	3.00
Chlorobenzene, Mono, 100 lb drs, lcl, wks .....lb.	.06	.07½	.06	.07½	.06	.07½
Chloroform, tech, 1000 lb drs .....lb.	.20	.21	.20	.21	.20	.21
USP, 25 lb tins .....lb.	.30	.31	.30	.31	.30	.31
Chloropicrin; comml cyls ..lb.	...	.80	...	.80	.85	.90
Chrome, Green, CP .....lb.	.21	.24	.20	.24	.21½	.23
Yellow .....lb.	.14½	.15½	.13	.16½	.11	.14
Chromium, Acetate, 8% Chrome, bbls .....lb.	.05	.08	.05	.08	.06	.08
20° soln, 400 lb bbls ...lb.	...	.05½	...	.05½	...	.05½
Fluoride, powd, 400 lb bbl .....lb.	.27	.28	.27	.28	.27	.28

j A delivered price; * Depends upon point of delivery.

Current

		Current Market		1937 Low	1937 High	1936 Low	1936 High
Coal tar, bbls	bbl.	7.50	8.00	6.75	9.00	7.25	9.00
Cobalt Acetate, bbls	lb.	.66	.68	.58	.68	.58	.60
Carbonate tech, bbls	lb.	...	1.63	1.42¾	1.63	1.35	1.48
Hydrate, bbls	lb.	...	1.78	1.60	1.78	1.66	1.76
Linoleate, solid, bbls	lb.	...	.33	.31	.33	.30	.31¼
Oxide, black, bgs	lb.	...	1.67	1.41	1.67	1.29	1.49
Resinate, fused, bbls	lb.	...	.13½	.13	.13½	.12½	.13
Precipitated, bbls	lb.	...	.34	.30½	.34	...	.32
Cochineal, gray or bk bgs	lb.	.35	.38	.32	.38	.32	.36
Teneriffe silver, bgs	lb.	.36	.39	.33	.39	.33	.37
Copper, metal, electrol 100 lb.		...	14.00	13.00	16.25	9.50	12.00
Carbonate, 400 lb bbls	lb.	.10½	.12½	.10½	.12½	...	.08¾
52-54% bbls	lb.	...	.18	.16¼	.19	.14½	.16¼
Chloride, 250 lb bbls	lb.	.15	.17	.15	.18	.17	.18
Cyanide, 100 lb drs	lb.	.37	.38	.37	.38	.37	.38
Oleate, precip, bbls	lb.	...	.20	...	.20	...	.20
Oxide, black, bbls, wks	lb.	...	nom.	.17½	.18	.14½	.15¾
red 100 lb bbls	lb.	...	nom.	.17	.18	.14	.15
Resinate, precip, bbls	lb.	.15	.16	.15	.19	.18	.19
Stearate, precip, bbls	lb.	.23	.24	.23	.40	.35	.40
Sub-acetate verdigris, 400 lb bbls	lb.	.18	.19	.18	.19	.18	.19
Sulfate, bbls, c-l, wks 100 lb.		...	5.15	4.55	6.00	3.85	4.55
Copperas, crys and sugar bulk c-l, wks	ton	12.00	13.00	12.00	13.00	13.00	16.00
Corn Sugar, tanners, bbls 100 lb.		...	3.79	3.74	4.34	3.08	4.03
Corn Syrup, 42°, bbls	100 lb.	...	3.91	3.76	4.36	3.05	3.95
43°, bbls	100 lb.	...	3.96	3.86	4.41	3.10	4.05
Cotton, Soluble, wet, 100 lb bbls	lb.	.40	.42	.40	.42	.40	.42
Cream Tartar, USP, powd & gran, 300 lb bbls	lb.	.19¾	.20¼	.15	.20¼	.15	.16¾
Creosote, USP, 42 lb cbys	lb.	.45	.47	.45	.47	.45	.47
Oil, Grade 1, tks	gal.	.13½	.14	.13	.14	.12½	.13½
Grade 2	gal.	.118	.128	.113	.128	.109	.12
Cresol, USP, drs	lb.	.12½	.13	.10	.13	.10	.10½
Crotonaldehyde, 98%, drs, wks	lb.	.26	.30	.26	.30	.26	.30
Cutch, Philippine, 100 lb bale	lb.	.04	.04¾	.04	.04¾	.04	.04¾
Cyanamid, bgs, c-l, frt allowed Ammonia unit		...	1.15	1.10	1.15	1.07½	1.10
Derris root 5% rotenone, bbls	lb.	.39	.47	.39	.47	...	...
Dextrin, corn, 140 lb bgs f.o.b., Chicago	100 lb.	4.25	4.45	4.25	5.00	3.45	5.00
British Gum, bgs	100 lb.	4.60	4.70	4.60	5.25	3.70	5.40
Potato, Yellow, 220 lb bgs	lb.	.07¾	.08¾	.07¾	.08¾	.07¾	.08¾
White, 220 lb bgs, lcl	lb.	.08	.09	.08	.09	.08	.09
Tapioca, 200 bgs, lcl	lb.	...	.08	...	.08	...	.08
White, 140 lb bgs	100 lb.	4.30	4.58	4.30	4.58	3.40	4.95
Diamylamine, c-l, drs, wks	lb.	.47	.75	.47	.75	.75	1.00
Diamylene, drs, wks	lb.	.095	.102	.095	.102	.095	.102
tks, wks	lb.	...	.08½	...	.08½	...	.08½
Diamylether, wks, drs	lb.	.085	.092	.085	.092	.085	.092
tks, wks	lb.	...	.075	...	.075	...	.075
Oxalate, lcl, drs, wks	lb.	...	.30	...	.30	...	...
Diamylphthalate, drs, wks	lb.	.20½	.21	.19	.21½	.18	.19½
Diamyl Sulfide, drs, wks	lb.	...	1.10	...	1.10	...	1.10
Dianisidine, bbls	lb.	2.25	2.45	2.25	2.45	2.25	2.45
Dibutoxy Ethyl Phthalate, drs, wks	lb.	...	.35	...	.35	...	...
Dibutyl Ether, drs, wks, lcl	lb.	...	.30	...	.30	...	...
Dibutylphthalate, drs, wks, frt allowed	lb.	...	.21	.19½	.21	.18	.21
Dibutyltartrate, 50 gal drs	lb.	.35	.40	.35	.50	.35	.40
Dichlorethylene, drs	gal.	.29	...	.29	...	.29	...
Dichloroethylether, 50 gal drs, wks	lb.	.15	.16	.15	.16	.16	.17
tks, wks	lb.	...	.14	...	.14	...	.15
Dichloromethane, drs, wks	lb.	...	.23	...	.23	...	.23
Dichloropentanes, drs, wks	lb.	no prices		no prices		.032	.040
tks, wks	lb.	no prices		no prices		...	.02½
Diethanolamine, tks, wks	lb.	...	.25	.25	.35	...	.30
Diethylamine, 400 lb drs	lb.	2.75	3.00	2.75	3.00	2.75	3.00
Diethylaniline, 850 lb drs	lb.	.50	.52	.50	.52	.50	.55
Diethyl Carbinol, drs	lb.	.60	.75	.60	.75	.60	.75
Diethylcarbonate, com drs	lb.	.31⅜	.35	.31⅜	.35	.31⅜	.35
90% grade, drs	lb.	...	.25	...	.25	...	.25
Diethylorthotoluidin, drs	lb.	.64	.67	.64	.67	.64	.67
Diethylphthalate, 1000 lb drs	lb.	.19	.19½	.18	.19½	.18	.19
Diethylsulfate, tech, drs, wks, lcl	lb.	...	.20	...	.20	...	.20
Diethyleneglycol, drs	lb.	.22	.23	.16½	.23	.15½	.17½
Mono ethyl ethers, drs	lb.	.16	.17	.16	.17	.15	.17
tks, wks	lb.	...	.15	...	.15	...	.15
Mono butyl ether, drs	lb.	...	.26	...	.26	...	.26
Diethylene oxide, 50 gal drs, wks	lb.	.20	.24	.20	.24	.20	.24
Diglycol Oleate, bbls	lb.	...	.21	.21	.24	...	.24
Laurate, bbls	lb.	...	.27½	...	...	...	...
Stearate, bbls	lb.	...	.27½	...	...	...	...
Dimethylamine, 400 lb drs, pure 25 & 40% sol 100% basis	lb.	...	1.00	...	.95	...	.95
Dimethylaniline, 340 lb drs	lb.	.26	.27	.26	.27	.26	.30
Dimethyl Ethyl Carbinol, drs	lb.	.60	.75	.60	.75	.60	.75
Dimethyl phthalate, drs, wks, frt allowed	lb.	...	.21	.20½	.21	.19½	.21½
Dimethysulfate, 100 lb drs	lb.	.45	.50	.45	.50	.45	.50
Dinitrobenzene, 400 lb bbls	lb. *k*	.16	.19	.16	.19	.16	.19½
Dinitrochlorobenzene, 400 lb bbls	lb.	.16½	.17½	.16	.17½	.14	.15½
Dinitronaphthalene, 350 lb bbls	lb.	.35	.38	.35	.38	.34	.37
Dinitrophenol, 350 lb bbls	lb.	.23	.24	.23	.24	.23	.24
Dinitrotoluene, 300 lb bbls	lb.	.14½	.15½	.14½	.15½	.14½	.16½

k Higher price is for purified material.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Diphenyl
Glue, Casein

Prices

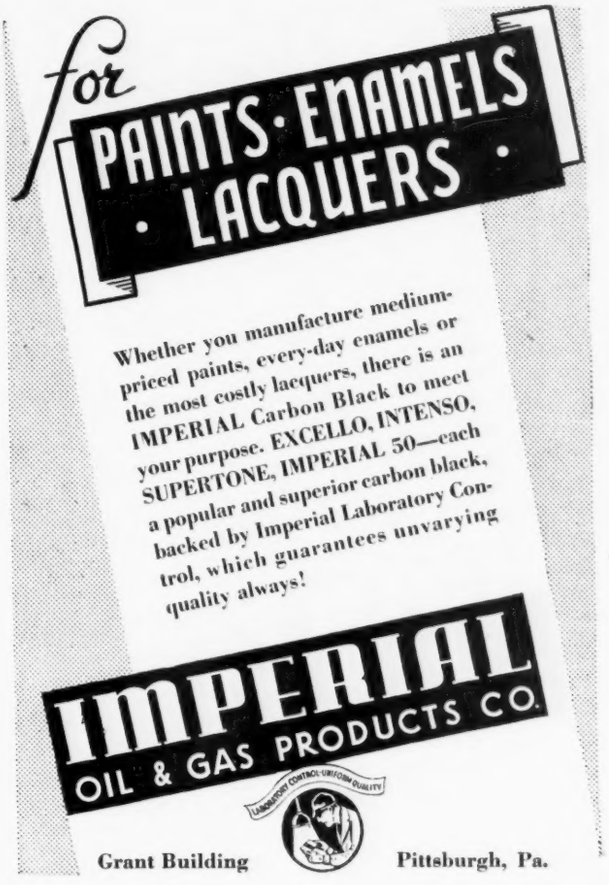
		Current Market		1937 Low	1937 High	1936 Low	1936 High
Diphenyl, bbls	lb.	.15	.25	.15	.25	.15	.25
Diphenylamine	lb.	.31	.32	.31	.32	.31	.32
Diphenylguanidine, 100 lb drs	lb.	.35	.37	.35	.37	.35	.37
Dip Oil, see Tar Acid Oil.							
Divi Divi pods, bgs shipmt	ton	34.00	nom.	34.00	nom.	32.00	45.00
Extract	lb.	.05	.05½	.05	.05½	.05	.05½
EGG YOLK							
Egg Yolk, dom., 200 lb cases	lb.	.68	nom.	.68	nom.	.63	.68
Imported	lb.	...	.57	.53	.57	.48	.56
Epsom Salt, tech, 300 lb bbls							
c-l NY	100 lb.	1.90	2.10	1.80	2.10	1.80	2.00
USP, c-l, bbls	100 lb.	...	2.10	2.00	2.10	...	2.00
Ether, USP anaesthesia 55 lb drs	lb.	.22	.23	.22	.23	.22	.23
(Conc)	lb.	.09	.10	.09	.10	.09	.10
Isopropyl 50 gal drs	lb.	.07	.08	.07	.08	.07	.08
tks, frt allowed	lb.	...	.06	...	.06	...	.06
Nitrous, conc, bottles	lb.	...	.68	.68	.77	.75	.77
Synthetic, wks, drs	lb.	.08	.09	.08	.09	.08	.09
Ethyl Acetate, 85% Ester							
tks, frt alld	lb.	...	.06½	...	.06½	.06½	.08
drs, frt alld	lb.	...	.07½	...	.07½	.07½	.09
95%, tks, frt allowed	lb.	...	.06¾	...	.06¾	.07	.08½
drs, frt alld	lb.	...	.07¾	...	.07¾	.08	.10
Acetoacetate, 110 gal drs	lb.	...	.27½	...	.27½	.37	.68
Benzylaniline, 300 lb drs	lb.	.86	.88	.86	.88	.86	.88
Bromide, tech, drs	lb.	.50	.55	.50	.55	.50	.55
Cellulose, drs, wks, frt allowed	lb.	.70	1.00	...	...	...	...
Chloride, 200 lb drs	lb.	.22	.24	.22	.24	.22	.24
Chlorocarbonate, cbys	lb.	...	.30	...	.30	...	.30
Crotonate, drs	lb.	1.00	1.25	1.00	1.25	1.00	1.25
Formate, drs, frt allowed	lb.	.27	.28	.27	.31	...	...
Lactate, drs, wks	lb.	...	.33	...	.33	.25	.29
Methyl Ketone, 50 gal drs, frt allowed	lb.	.07	.07½	.07	.07½	.07	.09
tks, frt allowed	lb.	...	.06½	...	.06½	.06½	.07½
Oxalate, drs, wks	lb.	.30	.34	.30	.34	.37½	.55
Oxybutyrate, 50 gal drs, wks	lb.	.30	.30½	.30	.30½	.30	.30½
Silicate, drs, wks	lb.	...	.77	...	.77	...	...
Ethylene Dibromide, 60 lb drs	lb.	.65	.70	.65	.70	.65	.70
Chloryhdrin, 40%, 10 gal cbys chloro, cont	lb.	.75	.85	.75	.85	.75	.85
Anhydrous	lb.	...	.75	...	.75	...	.75
Dichloride, 50 gal drs, wks	lb.	.0545	.0994	.0545	.0994	.0545	.0994
Glycol, 50 gal drs, wks	lb.	.17	.21	.17	.21	.17	.21
tks, wks	lb.	...	.16	...	.16	...	.16
Mono Butyl Ether, drs, wks	lb.	.20	.21	.20	.21	.20	.21
tks, wks	lb.	...	.19	...	.19	...	.19
Mono Ethyl Ether, drs, wks	lb.	.16	.17	.16	.17	.16	.17
tks, wks	lb.	...	.15	...	.15	...	.15
Mono Ethyl Ether Acetate, drs, wks	lb.	...	.14	...	.14	.14	.18½
tks, wks	lb.	...	.13	...	.13	.13	.16½
Mono, Methyl Ether, drs wks	lb.	.18	.22	.18	.22	.19	.23
tks, wks	lb.	...	.17	...	.17	...	.18
Oxide, cyl	lb.	.50	.55	.50	.55	.50	.60
Ethylidenaniline	lb.	.45	.47½	.45	.47½	.45	.47½
Feldspar, blk pottery	ton	...	14.50	...	14.50	...	14.50
Powd, blk, wks	ton	14.00	14.50	14.00	14.50	14.00	14.50
Ferric Chloride, tech, crys, 475 lb bbls	lb.	.05	.07½	.05	.07½	.05	.07½
sol, 42° cbys	lb.	.06¼	.06½	.06¼	.06½	.06¼	.06½
Fish Scrap, dried, unground, wks	unit *l*	...	3.50	3.50	4.25	2.50	3.50
Acid, Bulk, 6 & 3%, delv Norfolk & Baltimore basis	unit *m*	...	2.90	3.00	3.15	...	2.25
Fluorspar, 98%, bgs	lb.	no prices		no prices		30.00	35.50
Formaldehyde, USP, 400 lb bbls, wks	lb.	.05¾	.06¼	.05¾	.06¼	.05¾	.07
Fossil Flour	lb.	.02½	.04	.02½	.04	.02½	.04
Fullers Earth, blk, mines	ton	6.50	15.00	6.50	15.00	6.50	15.00
Imp powd, c-l, bgs	ton	23.00	30.00	23.00	30.00	23.00	30.00
Furfural (tech) drs, wks	lb.	.10	.15	.10	.15	.10	.15
Furfuramide (tech) 100 lb drs	lb.	...	.30	...	.30	...	.30
Fusel Oil, 10% impurities	lb.	.16	.18	.16	.18	.16	.18
Fustic, crystals, 100 lb boxes	lb.	.22	.26	.20	.26	.20	.23
Liquid 50°, 600 lb bbls	lb.	.09½	.13	.08½	.13	.08½	.12
Solid, 50 lb boxes	lb.	.17½	.19½	.16	.19½	.16	.18
G SALT PASTE							
G Salt paste, 360 lb bbls	lb.	.45	.47	.45	.47	.45	.47
Gall Extract	lb.	.19	.20	.19	.20	.18	.20
Gambier, com 200 lb bgs	lb.	...	nom.	...	nom.	...	.06
Singapore cubes, 150 lb bgs	100 lb.	...	.10½	.09½	.10½	.08	.09
Gelatin, tech, 100 lb cs	lb.	.50	.55	.50	.55	.50	.55
Glauber's Salt, tech, c-l, bgs, wks*	100 lb.	.95	1.15	.95	1.15	.95	1.30
Anhydrous, see Sodium Sulfate.							
Glue, bone, com grades, c-l bgs	lb.	.14	.17½	.11	.17½	.10½	.17½
Better grades, c-l, bgs	lb.	.15½	.17½	.12½	.17½	.12	.17½
Casein, kgs	lb.	.18	.22	.18	22	.18	.22

l + 10; *m* + 50; *Bbls. are 20c higher.

Current

Glycerin
Gum, Hemlock

		Current Market		1937 Low	1937 High	1936 Low	1936 High
Glycerin, CP, 550 lb drs	lb.	.21½	.22	.21½	.29	.16	.21½
Dynamite, 100 lb drs	lb.	.21½	.22	.21½	.29	.13¾	.21½
Saponification, drs	lb.	.16	.16½	.15½	.29	.10¼	.22
Soap Lye, drs	lb.	.14½	.15	.14	.27	.09¼	.20
Glyceryl Bori-Borate, bbls	lb.	...	.40	...	...	...	...
Monoricinoleate, bbls	lb.	...	.27	...	...	...	...
Monostearate, bbls	lb.	...	.30	...	...	...	...
Oleate, bbls	lb.	...	.22	...	...	...	...
Phthalate	lb.	...	.37	.29	.37	.28	.29
Glyceryl Stearate, bbls	lb.	...	.18	...	.18	...	.18
Glycol Bori-Borate, bbls	lb.	...	.26	...	...	...	...
Phthalate, drs	lb.	...	.40	.29	.40	.29	.35
Stearate, drs	lb.	...	.27½	.23	.27½	...	.23
GUMS							
Gum Aloes, Barbadoes	lb.	.85	.90	.85	.90	.85	.90
Arabic, amber sorts	lb.	.13	.13½	.10½	.15½	.09	.10¾
White sorts, No. 1, bgs	lb.	.29	.30	.27	.30	.25	.28
No. 2, bgs	lb.	.27	.28	.25	.28	.24	.26
Powd, bbls	lb.	.16½	.17	.14	.19	.13	.14
Asphaltum, Barbadoes (Manjak) 200 lb bgs, f.o.b., NY	lb.	.02½	.10½	.02½	.10½	.02½	.10½
California, f.o.b., NY, drs	ton	29.00	55.00	29.00	55.00	29.00	55.00
Egyptian, 200 lb cases, f.o.b., NY	lb.	.12	.15	.12	.15	.12	.15
Benzoin Sumatra, USP, 120 lb cases	lb.	.22	.25	.16	.25	.15	.19
Copal, Congo, 112 lb bgs, clean, opaque	lb.	...	.19¼	.18⅞	.19¼	.18½	.20
Dark amber	lb.	...	.08⅞	.06⅞	.08⅞	.06⅞	.08
Light amber	lb.	...	.14⅜	.10¼	.14⅜	.10¼	.14⅛
Copal, East India, 180 lb bgs							
Macassar pale bold	lb.	...	.13	...	.13	.12⅝	.14
Chips	lb.	...	.05¾	.05¾	.06½	.06⅛	.06½
Dust	lb.	.03⅝	.04⅛	.03⅝	.04⅛	.03⅝	.04⅛
Nubs	lb.	...	.10¾	.10¾	.11¼	.10⅜	.11⅛
Singapore, Bold	lb.	...	.15⅝	...	.15⅝	.15⅛	.16⅞
Chips	lb.	...	.04¾	.04¼	.05	.04⅜	.05¼
Dust	lb.	.03⅝	.04⅛	.03⅝	.04⅛	.03⅝	.04⅛
Nubs	lb.	...	.10⅜	.10⅜	.10¾	.10	.11¼
Copal Manilla, 180-190 lb baskets, Loba A	lb.	...	.12	.09¾	.12	.09¼	.13
Loba B	lb.	...	.11⅝	.09¼	.11⅝	.08⅞	.12
Loba C	lb.	...	.11¼	.08⅞	.11¼	.08⅜	.11⅛
DBB	lb.	...	.08¾	.08	.08¾	.07⅝	.08⅞
Dust	lb.	...	.06½	.05¾	.06⅝	.05	.06⅛
MA sorts	lb.	...	.07¼	.06¾	.07¼	.06¾	.07⅝
Copal Pontianak, 224 lb cases, bold genuine	lb.	...	.16½	.15½	.16½	.14¼	.16
Chips	lb.	...	.10¼	.09⅛	.11⅛	.07	.08½
Mixed	lb.	...	.14	.13½	.14	.13¼	.13¾
Nubs	lb.	...	.12⅞	.12¾	.13½	.10¼	.12
Split	lb.	...	.14⅝	.13½	.15¼	.12¾	.13
Dammar Batavia, 136 lb cases							
A	lb.	...	.25½	.23½	.25½	.21⅜	.22¼
B	lb.	...	.24	.22⅛	.24	.20⅜	.21½
C	lb.	...	.20⅜	.18½	.20⅜	.16½	.17⅝
D	lb.	...	.17½	.15¼	.17½	.13⅝	.14⅜
A/D	lb.	...	.20⅜	.17⅝	.20⅜	.15½	.17⅛
A/E	lb.	...	.17¼	.14⅞	.17¼	.12⅞	.14½
E	lb.	...	.08½	.07½	.08½	.06¾	.07⅛
F	lb.	...	.07¼	.06¼	.07¼	.05⅞	.06⅞
Singapore, No. 1	lb.	...	.22	.17⅛	.22	.16¼	.17½
No. 2	lb.	...	.16¼	.14⅛	.16¼	.13	.14¼
No. 3	lb.	...	.05¾	...	.05¾	.05¼	.05¾
Chips	lb.	...	.13½	.10¼	.13½	.09¾	.09¾
Dust	lb.	...	.05¾	.05¾	.06	.04¼	.05⅝
Seeds	lb.	...	.09½	.07⅞	.09½	.06⅝	.07⅜
Elemi, cons	lb.	.09⅜	.09½	.09⅜	.10¼	.09¾	.10¼
Ester	lb.	.10	.10½	.10	.12	.07⅝	.10
Gamboge, pipe, cases	lb.	.75	.80	.58	.80	.58	.59
Powd, bbls	lb.	.80	.85	.65	.85	.65	.66
Ghatti, sol. bgs	lb.	.11	.15	.11	.15	.11	.15
Karaya, powd, bbls, xxx	lb.	.27	.30	.24	.30	.24	.25
xx	lb.	.18	.19	.16	.19	.16	.17
No. 1	lb.	.12	.13	.09½	.13	.09½	.10
No. 2	lb.	.11	.12	.08½	.12	.08½	.09
Kauri, NY, San Francisco, Brown XXX, cases	lb.	.60	.60½	.60	.60½	.60	.60½
BX	lb.	...	.38	.33	.38	.33	.33½
B1	lb.	...	.28	.21	.28	.19	.21
B2	lb.	...	.24	.15½	.26	.14½	.15½
B3	lb.	...	.18½	.12	.18½	.12	.12½
Pale XXX	lb.	...	.61	.61	.65½	.65	.65½
No. 1	lb.	...	.41	.40	.41	.40	.40½
No. 2	lb.	...	.24	.22	.24	.22	.22½
No. 3	lb.	...	.17¾	.15	.17¾	.15	.15½
Kino, tins	lb.	2.00	2.10	.70	2.10	.70	.80
Mastic	lb.	.55	.56	.55	.58	.56	.60½
Sandarac, prime quality, 200 lb bgs & 300 lb cks	lb.	.25	.26	.25	.35	.19½	.38
Senegal, picked bgs	lb.	.27	.29	.20	.29	.20	.21
Sorts	lb.	.14½	.15	.09¾	.15	.09¾	.12½
Thus, bbls	280 lbs.	13.75	14.00	12.00	14.00	11.00	12.00
Strained	280 lbs.	...	14.00	12.00	14.00	11.00	12.00
Tragacanth, No. 1, cases	lb.	2.75	3.00	2.40	3.25	1.20	2.50
No. 2	lb.	2.40	2.75	2.00	2.75	1.10	2.10
No. 3	lb.	2.35	2.70	1.95	2.70	.95	2.05
No. 4	lb.	2.30	2.65	1.85	2.65	.85	1.95
No. 5	lb.	2.25	2.50	1.65	2.50	.75	1.75
Yacca, bgs	lb.	.03½	.04½	.03¼	.04½	.03¼	.03¾
Helium, cyl (200 cu. ft.)	cyl.	...	25.00	...	25.00	...	25.00
Hematine crystals, 400 lb bbls	lb.	.18	.34	.16	.34	.16	.34
Hemlock, 25%, 600 lb bbls, wks	lb.	.03	.03¼	.03	.03¼	...	.02⅞
tks	lb.	...	.02¾	...	.02¾	...	.02½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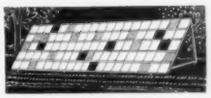

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Prices

	Current Market	1937 Low	1937 High	1936 Low	1936 High
Hexalene, 50 gal drs, wks lb.	...	.30	...	.30	...	.30
Hexane, normal 60-70° C. Group 3, tks gal.	...	.10½	...	.10½	...	.12
Hexamethylenetetramine, powd, drs lb.	.35	.36	.35	.36	.35	.39
Hexyl Acetate, secondary, delv, drs lb.	.13	.13½	.13	.13½	.13	.13½
tks lb.	...	.12	...	.12	...	.11½
Hoof Meal, f.o.b. Chicago unit	...	3.40	3.40	3.75	2.35	3.00
Hydrogen Peroxide, 100 vol, 140 lb cbys lb.	.20	.21	.20	.21	.20	.21
Hydroxyamine Hydrochloride lb.	...	3.15	...	3.15	...	3.15
Hypernic, 51°, 600 lb bbls lb.	.16	.21	.15	.21	.17	.20
INDIGO						
Indigo, Bengal, bbls lb.	...	2.40	...	2.40	...	...
Synthetic, liquid lb.	.16½	.19	.16½	.19	.13	.14
Iodine, Resublimed, kgs lb.	1.50	1.60	1.50	1.60	1.50	1.75
Irish Moss, ord, bales lb.	.11	.12	.11	.12	.09	.10
Bleached, prime, bales lb.	.19	.20	.19	.21	.18	.19
Iron Acetate Liq. 17°, bbls lb.	.03	.04	.03	.04	.03	.04
Chloride see Ferric Chloride.						
Nitrate, coml, bbls 100 lb.	2.32	3.11	2.32	3.25	2.75	3.25
Isobutyl Carbinol (128-132°C) drs, wks lb.	.33	.34	.33	.34	.33	.34
tks, wks lb.	...	.32	...	.32	...	.32
Isopropyl Acetate, tks, frt allowed lb.	...	.06½	...	.06½	.06	.07½
drs, frt allowed lb.	.07½	.08	.07½	.08	.07	.09
Ether, see Ether, isopropyl.						
Keiselguhr, 95 lb bgs, NY, Brown ton	60.00	70.00	60.00	70.00	60.00	70.00
LEAD ACETATE						
Lead Acetate, f.o.b. NY, bbls, White, broken lb.	...	.13½	.11½	.13½	.11	.11½
cryst, bbls lb.	...	.13½	.11½	.13½	.10½	.11½
gran, bbls lb.	...	.14¼	.12¼	.14¼	.11	.12¼
powd, bbls lb.	...	.14¼	.12¼	.14¼	.11¼	.12¼
Arsenate, East, drs lb.	.11½	.12	.11	.12	.09	.10
West, drs lb.	.11½	.12	.11	.12½	.09	.09¾
Linoleate, solid, bbls lb.	...	.19	.18	.19	.18	.26½
Metal, c-l, NY 100 lb.	...	6.25	6.00	7.05	4.50	6.00
Nitrate, 500 lb bbls, wks lb.	.11	.11½	.09	.11½	.09	.09½
Oleate, bbls lb.	.18½	.20	.15	.20	.15	.16
Red, dry, 95% Pb_3O_4, delv lb.	.09	.09¼	.08½	.0945	.07	.085
97% Pb_3O_4, delv lb.	...	.09¼	.08¾	.09¾	.07¼	.08¾
98% Pb_3O_4, delv lb.	...	.09½	.09	.10	.07½	.09
Resinate, precip, bbls lb.	...	.16½	.14	.16½	...	.14
Stearate, bbls lb.	.22	.23	.22	.23	.22	23
Titanate, bbls, c-l, f.o.b. wks, frt allowed lb.	...	.12	.10	.12	...	...
White, 500 lb bbls, wks lb.	...	.08	.07¼	.09	.06½	.07¼
Basic sulfate, 500 lb bbls, wks lb.	...	.07½	.06¾	.08¾	.06	.06½
Lime, chemical quicklime, f.o.b., wks, bulk ton	6.00	8.00	6.00	8.00	7.00	7.25
Hydrated, f.o.b., wks ton	8.00	12.00	8.00	12.00	8.50	12.00
Lime Salts, see Calcium Salts.						
Lime sulfur, dealers, tks gal.	...	.11	...	.11	...	.11
drs gal.	.13	.16	.13	.16	.13	.16
Linseed Meal, bgs ton	...	41.00	35.00	42.50	29.00	40.50
Litharge, coml, delv, bbls lb.	...	.08	.07½	.08½	.06	.075
Lithopone, dom, ordinary, delv, bgs lb.	.04⅜	.04⅝	.04¼	.04⅝	.04¼	.04¾
bbls lb.	.04⅝	.04⅞	.04½	.04⅞	.04½	.05
High strength, bgs lb.	.05⅞	.06⅛	.05¾	.06⅛	.05¾	.06¼
bbls lb.	.06⅛	.06⅜	.06	.06⅜	.06	.06½
Titanated, bgs lb.	.05⅞	.06⅛	.05¾	.06⅛	.05¾	.06¼
bbls lb.	.06⅛	.06⅜	.06	.06⅜	.06	.06½
Logwood, 51°, 600 lb bbls lb.	.09½	.11½	.08½	.11½	.06½	.10½
Solid, 50 lb boxes lb.	.15	.19	.15	.17½	.13½	.17½
Sticks ton	24.00	25.00	24.00	25.00	24.00	26.00
MADDER						
Madder, Dutch lb.	.22	.25	.22	.25	.22	.25
Magnesite, calc, 500 lb bbl ton	60.00	65.00	60.00	65.00	60.00	65.00
Magnesium Carb, tech, 70 lb bgs, wks lb.	.06¼	.07	.06	.07	.06	.06½
Chloride flake, 375 lb drs, c-l, wks ton	39.00	42.00	39.00	42.00	36.00	42.00
Fluosilicate, crys, 400 lb bbls, wks lb.	.10	.10½	.10	.10½	.10	.10½
Oxide, USP, light, 100 lb bbls lb.	.36	.40	.36	.40	...	.42
Heavy, 250 lb bbls lb.	...	.50	...	.50	...	.50
Palmitate, bbls lb.	.33	nom.	.33	nom.	.23	.24
Silicofluoride, bbls lb.	.09½	.10½	.09½	.10½	...	...
Stearate, bbls lb.	.21	.24	.21	.24	.20	.24
Manganese acetate, drs lb.	...	.26½	.25½	.26½	...	...
Borate, 30%, 200 lb bbls lb.	.15	.16	.15	.16	.15	.16
Chloride, 600 lb cks lb.	.09	.12	.09	.12	.09	.12
Dioxide, tech (peroxide), paper bgs, c-l ton	...	52.50	47.50	52.50	...	47.50
Hydrate, bbls lb.	...	.32	...	.32	...	...
Linoleate, liq, drs lb.	.18	.19¼	.18	.19¼	...	...
solid, precip, bbls lb.	...	.19	.17½	.19	...	...
Resinate, fused, bbls lb.	.08¼	.08½	.08¼	.08½	...	...
precip, drs lb.	...	.12	...	.12	...	...
Sulfate, tech, anhyd, 90-95%, 550 lb drs lb.	.07	.07½	.07	.07½	...	...
Mangrove, 55%, 400 lb bbls lb.	...	.04	...	.04	...	.04
Bark, African ton	25.50	26.00	25.00	27.00	25.50	27.00

	Current Market	1937 Low	1937 High	1936 Low	1936 High
Mannitol, pure cryst, cs, wks lb.	...	1.45	1.45	1.48	1.48	1.60
Marble Flour, blk .....ton	12.00	13.00	12.00	13.00	12.00	13.00
Mercury chloride (Calomel) lb.	1.59	1.60	1.05	1.60	.81	1.20
Mercury metal ...76 lb. flasks	89.00	90.00	89.00	99.00	73.50	95.00
Meta-nitro-aniline .....lb.	.67	.69	.67	.69	.67	.69
Meta-nitro-paratoluidine 200 lb bbls .....lb.	1.45	1.55	1.45	1.55	1.40	1.55
Meta-phenylene-diamine 300 lb bbls .....lb.	.80	.84	.80	.84	.80	.84
Meta-toluene-diamine, 300 lb bbls .....lb.	.65	.67	.65	.67	.65	.69
Methanol, denat, grd, drs, c-l, frt all'd .....gal.	...	.44	.44	.53	...	...
tanks, frt all'd .....gal.	...	.38	.38	.48	...	...
Pure, drs, c-l, frt all'd gal.	...	.38	...	.38	...	...
tanks .....gal.	...	.33	...	.33	...	...
95%, tks .....gal.	...	.31	...	.31	...	...
97%, tks .....gal.	...	.32	...	.32	...	...
Methyl Acetate, dom, 98-100%, drs .....lb.	.16	.17½	.16	.17½	.11	.18½
Acetone, frt all'd, drs gal. *p*	.36	.42	.36	.58½	.45½	.68½
tks, frt allowed, drs gal. *p*	.30	.34	.30	.44½	.41	.48
Synthetic, frt all'd, east of Rock M.. drs .....gal. *p*	.42	.51	.42	.59½	.52½	.60
tks, frt all'd ....gal.	.36	.39½	.36	.49½	.48	.53
West of Rocky M., frt all'd, drs ..gal. *p*	...	.46	.46	.58	.55½	.69
tks, frt all'd ..gal. *p*	...	.39½	.39½	.51	.51	.63½
Anthraquinone .....lb.	.65	.67	.65	.67	.65	.67
Butyl Ketone, tks .....lb.	...	.10½	...	.10½	...	.10½
Chloride, 90 lb cyl .....lb.	.32	.40	.32	.43	...	.45
Ethyl Ketone, tks .....lb.	...	.07½	...	.07½	...	.07½
Formate, drs, frt allowed lb.	.35	.36	.35	.39	...	...
Hexyl Ketone, pure, drs lb.	...	.60	...	.60	...	.60
Lactate, drs, frt allowed lb.	...	.30	...	.30	...	...
Propyl carbinol, drs ....lb.	.60	.75	.60	.75	.60	.75
Mica, dry grd, bgs, wks ..lb.	35.00	...	35.00	...	35.00	...
Michler's Ketone, kgs ....lb.	...	2.50	...	2.50	...	2.50
Molasses, blackstrap, tks, f.o.b. NY .....gal.	...	.07	.07	.07¼	.07	.08¼
Monoamylamine, c-l, drs, wks lb.	.52	1.00	.52	1.00	...	1.00
Monochlorobenzene, see Chlorobenzene, mono.						
Monoethanolamine, tks, wks lb.	...	.25	.25	.30	...	.30
Monomethylamine, drs, frt all'd, E. Mississippi, c-l ..lb.	...	.65	...	.65	...	...
Monomethylparaminosulfate, 100 lb drs .....lb.	3.75	4.00	3.75	4.00	3.75	4.00
Myrobalans 25%, liq bbls..lb.	...	.04¼	...	.04¼	...	.04¼
50% Solid, 50 lb boxes lb.	.06	.06¼	.06	.06¼	.06	.06¼
J1 bgs .....ton	...	29.00	26.50	29.50	22.00	26.50
J2 bgs .....ton	...	20.50	19.00	20.75	14.25	16.75
R2 bgs .....ton	...	20.00	18.75	20.25	14.00	16.25
NAPHTHA						
Naphtha, v.m.&p. (deodorized) see petroleum solvents.						
Naphtha, Solvent, water-white, tks .....gal.	...	.31	...	.31	...	.31
drs, c-l .....gal.	...	.36	...	.36	...	.36
NAPHTHALENE						
Naphthalene, dom, crude, bgs, wks .....lb.	...	2.50	2.00	3.00	2.75	4.50
Imported, cif, bgs ....lb.	...	2.25	2.25	3.00	...	...
Balls, flakes, pks .....lb.	...	.08	...	.08	.07¼	.08
Balls, ref'd, bbls, wks ..lb.	...	.07¼	...	.07¼	.06¾	.07¼
Flakes, ref'd, bbls, wks..lb.	...	.07¼	...	.07¼	.06¾	.07¼
Nickel Carbonate, bbls....lb.	.36	.37½	.36	.37½	...	.36
Chloride, bbls .....lb.	.18	.20	.18	.20	.18	.19
Metal ingot .....lb.	...	.35	...	.35	...	.35
Oxide, 100 lb kgs, NY..lb.	.35	.37	.35	.37	.35	.37
Salt, 400 lb bbls, NY ...lb.	.13	.13½	.13	.13½	.13	.13½
Single, 400 lb bbls, NY lb.	.13	.13½	.13	.13½	.13	.13½
Nicotine, 40%, drs, sulfate, 55 lb drs .....lb.	...	.76	...	.76	.75	1.17
Nitre Cake, blk .....ton	...	16.00	...	16.00	12.00	14.00
Nitrobenzene, redistilled, 1000 lb drs, wks .....lb.	.08	.10	.08	.10	.08	.11
tks .....lb.	...	.07½	...	.07½	...	.08½
Nitrocellulose, c-l-l c-l, wks lb.	.22	.29	.26	.29	.26	.34
Nitrogenous Mat'l, bgs, imp unit	...	3.15	3.15	3.55	2.00	3.10
dom, Eastern wks ....unit	...	3.10	2.90	4.25	1.90	3.00
dom, Western wks ....unit	...	2.85	2.85	3.75	1.85	2.75
Nitronaphthalene, 550 lb bbls lb.	.24	.25	.24	.25	.24	.25
Nutgalls Alleppo, bgs .....lb.	.20	.22	.20	.22	.16	.18
Chinese, bgs .....lb.	.20	.22	.20	.22	.19	.20
OAK BARK						
Oak Bark Extract, 25%, bbls lb.	...	.03½	...	.03½	...	.03½
tks .....lb.	...	.02¾	...	.02¾	...	.02¾
Octyl Acetate, tks, wks ...lb.	.16	.17	.16	.17	...	.15
Orange-Mineral, 1100 lb cks NY .....lb.	...	.12	.11¼	.12¾	.10	.11¼
Orthoaminophenol, 50 lb kgs. lb.	2.15	2.25	2.15	2.25	2.15	2.25
Orthoanisidine, 100 lb drs lb.	.70	.74	.70	.74	.82	.84
Orthochlorophenol, drs ....lb.	.35	.75	.35	.75	.50	.65
Orthocresol, drs, wks .....lb.	.13½	.14½	.13½	.14½	.13	.15
Orthodichlorobenzene, 1000 lb drs .....lb.	.06	.07	.05	.07	.05	.11½

o Country is divided in 4 zones, prices varying by zone; *p* Country is divided into 4 zones. Also see footnote directly above; *q* Naphthalene quoted on Pacific Coast F.A.S. Phila. or N. Y.

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Booklet on request

Pfaltz & Bauer, Inc.

EMPIRE STATE BUILDING, NEW YORK

Orthonitrochlorobenzene
Phloroglucinol

Prices

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Orthonitrochlorobenzene, 1200 lb drs, wks ..... lb.	.28	.29	.28	.29	.28	.29
Orthonitroparachlorphenol, tins ..... lb.	.70	.75	.70	.75	.70	.75
Orthonitrophenol, 350 lb drs ..... lb.	.85	.90	.85	.90	.52	.80
Orthonitrotoluene, 1000 lb drs, wks ..... lb.	.07	.10	.07	.10	.07	.10
Orthotoluidine, 350 lb bbls, l-c-l ..... lb.	.16	.17	.14	.17	.14	.15
Osage Orange, cryst, bbls .. lb.	.17	.25	.17	.25	.17	.25
51° liquid ..... lb.	.07	.08	.07	.08	.07	.07¾
Paraffin, rfd, 200 lb cs slabs 122-127° M P ..... lb.	.0445	.04½	.0445	.04½	.0445	.04½
128-132° M P ..... lb.	.04¾	.049	.04¾	.049	.04¾	.049
133-137° M P ..... lb.	.05½	.05¾	.05½	.05¾	.05½	.05¾
Para aldehyde, 110-55 gal drs ..... lb.	.16	.18	.16	.18	.16	.18
Aminoacetanilid, 100 lb kgs ..... lb.	...	.85	...	.85	...	.85
Aminohydrochloride, 100 lb kgs ..... lb.	1.25	1.30	1.25	1.30	1.25	1.30
Aminophenol, 100 lb kgs lb.	...	1.05	...	1.05	...	1.05
Chlorophenol, drs ..... lb.	.30	.45	.30	.45	.50	.65
Dichlorobenzene, 200 lb drs, wks ..... lb.	.16	.18	.16	.20	.16	.20
Formaldehyde, drs, wks .. lb.	.34	.35	.34	.35	.34	.39
Nitroacetanilid, 300 lb bbls ..... lb.	.45	.52	.45	.52	.45	.52
Nitroaniline, 300 lb bbls, wks ..... lb.	.45	.47	.45	.47	.47	.51
Nitrochlorobenzene, 1200 lb drs, wks ..... lb.	.23½	.24	.23½	.24	.23½	.24
Nitro-orthotoluidine, 300 lb bbls ..... lb.	2.75	2.85	2.75	2.85	2.75	2.85
Nitrophenol, 185 lb bbls lb.	.35	.37	.35	.37	.45	.50
Nitrosodimethylaniline, 120 lb bbls ..... lb.	.92	.94	.92	.94	.92	.94
Nitrotoluene, 350 lb bbls lb.	...	.35	...	.35	.36	.37
Para Tertiary amyl phenol, wks, drs, c-l ..... lb.	...	.26	...	.26	.26	.50
Phenylenedamine, 350 lb bbls ..... lb.	1.25	1.30	1.25	1.30	1.25	1.30
Toluenesulfonamide, 175 lb bbls ..... lb.	.70	.75	.70	.75	.70	.75
tks, wks ..... lb.	...	.31	...	.31	...	.31
Toluenesulfonchloride, 410 lb bbls, wks ..... lb.	.20	.22	.20	.22	.20	.22
Toluidine, 350 lb bbls, wks ..... lb.	.56	.58	.56	.58	.56	.60
Paris Green, dealer, drs, frt E. of Cleveland ..... lb.	.22	.24	.22	.24	...	.24
Pentane, normal, 28-38° C, group 3, tks ..... gal.	...	.08½	.08½	.09½	.09	.09½
drs, group 3 ..... gal.	.14	.16	.12½	.16	.10	.16
Perchlorethylene, 100 lb drs, frt allowed ..... lb.	...	.10½	...	.10½	.10½	.15
Petrolatum, dark amber, bbls ..... lb.	.02⅞	.03	.02⅝	.03	.02⅝	.02⅞
Light, bbls ..... lb.	.03⅛	.03⅜	.03⅛	.03⅜	.03⅛	.03⅜
Medium, bbls ..... lb.	.02⅞	.03⅛	.02⅞	.03⅛	.02⅞	.03⅛
Dark green, bbls ..... lb.	.02½	.02¾	.02½	.02¾	.02½	.02¾
Red, bbls ..... lb.	.02⅝	.03¼	.02⅛	.03¼	.02⅛	.02⅝
White, lily, bbls ..... lb.	.06	.06¼	.06	.06¼	.06	.06¼
White, snow, bbls ..... lb.	.07	.07¼	.07	.07¼	.07	.07¼
Petroleum Ether, 30-60°, group, 3 tks ..... gal.	...	.13	...	.13	...	.13
drs, group 3 ..... gal.	.14	.17	.15	.17	.15	.16

PETROLEUM SOLVENTS AND DILUENTS

Cleaners naphthas, group 3, tks, wks ..... gal.	.07⅜	.07⅞	.07⅜	.07⅞	.07⅜	.07½
Bayonne, tks, wks .. gal.	...	.10	.09½	.10	.09	.09½
West Coast, tks .... gal.	...	.15	...	.15	...	.15
Hydrogenated, naphthas, frt allowed East, tks ... gal.	...	.16	...	.16	.15	.16
No. 2, tks ..... gal.	...	.18	...	.18	...	.18
No. 3, tks ..... gal.	...	.16	...	.16	...	.15
No. 4, tks ..... gal.	...	.18	...	.18	...	.18
Lacquer diluents, tks Bayonne ..... gal.	.12	.12½	.12	.12½	.12	.12½
Group 3, tks ..... gal.	.08⅜	.08⅞	.08⅜	.08⅞	.07⅞	.08¼
Naphtha, V.M.P., East, tks, wks ..... gal.	...	.11	.10	.11	.09	.10
Group 3, tks, wks ... gal.	.07⅜	.07⅞	.07⅜	.07⅞	.07⅜	.07½
Petroleum thinner, East, tks, wks ..... gal.	...	.09½	.09	.10	.09	.09½
Group 3, tks, wks ... gal.	.06⅜	.06⅞	.06⅜	.06⅞	.06⅜	.06⅝
Rubber Solvents, stand grd, East, tks, wks ..... gal.	...	.10	.09½	.10	.09	.09½
Group 3, tks, wks ... gal.	.07⅜	.07⅞	.07⅜	.07⅞	.07⅜	.07½
Stoddard Solvent, East, tks, wks ..... gal.	...	.10	.09½	.10	.09	.09½
Group 3, tks, wks ... gal.	.06⅞	.07⅜	.06⅞	.07⅜	.06⅞	.07
Phenol, 250-100 lb drs .... lb.	.14½	.15½	.13¼	.15½	.13¼	.15
tks, wks ..... lb.	...	.13½	.12¾	.13½	...	...
Phenyl-Alpha-Naphthylamine, 100 lb kgs ..... lb.	...	1.35	...	1.35	...	1.35
Phenyl Chloride, drs ..... lb.	...	.17	.16	.17	...	.16
Phenylhydrazine Hydrochloride, com ..... lb.	2.30	6.50	2.30	6.50	2.90	3.00
Phloroglucinol, tech, tins .. lb.	15.00	16.50	15.00	16.50	15.00	16.50
CP, tins ..... lb.	20.00	22.00	20.00	22.00	20.00	22.00

Current

Phosphate Rock
Rosin Oil

	Current Market	1937 Low	1937 High	1936 Low	1936 High
Phosphate Rock, f.o.b. mines					
Florida Pebble, 68% basis ton	...	1.85	...	1.85	...	1.85
70% basis ton	...	2.35	...	2.35	...	2.35
72% basis ton	...	2.85	...	2.85	...	2.85
75-74% basis ton	...	3.85	...	3.85	...	3.85
75% basis ton	...	5.50	...	5.50	...	4.35
Tennessee, 72% basis ton	...	4.50	...	4.50	...	4.50
Phosphorus Oxychloride 175 lb cyl lb.	.16	.20	.16	.20	.16	.20
Red, 110 lb cases lb.	.40	.44	.40	.44	.40	.45
Sesquisulfide, 100 lb cs. lb.	.38	.44	.38	.44	.38	.44
Trichloride, cyl lb.	.15	.18	.15	.20	.16	.20
Yellow, 110 lb cs, wks lb.	.24	.30	.24	.33	.28	.33
Phthalic Anhydride, 100 lb drs, wks lb.	.14½	nom.	.14½	.15½	.14½	.15½
Pine Oil, 55 gal drs or bbls						
Destructive dist lb.	.52	.55	.49	.65	.44	.50
Steam dist wat wh bbls gal.	...	.69	.64	.79	.64	.65
tks gal.	...	.64	.59	.74	...	.59
Pitch Hardwood, wks ton	18.25	18.75	15.00	18.75	...	15.00
Coaltar, bbls, wks ton	.	19.00	...	19.00	...	19.00
Burgundy, dom, bbls, wks lb.	.05½	.06½	.03½	.06½	...	.03½
Imported lb.	.11½	.12½	.11	.13	.11	.13
Petroleum, see Asphaltum in Gums' Section.						
Pine, bbls bbl.	6.00	6.50	6.00	6.50	4.00	5.25
Stearin, drs lb.	.03	.04½	.03	.04½	.03	.04½
Platinum, ref'd oz.	47.00	56.00	45.00	68.00	34.50	64.00
POTASH						
Potash, Caustic, wks, sol. lb.	.06¼	.06½	.06¼	.06½	.06¼	.06½
flake lb.	.07	.07½	.07	.07½	.07	.07½
Liquid, tks lb.	...	.02⅞	...	.02⅞	...	.02⅞
Manure Salts, imported 30% basis, blk unit	...	.58½	.55	.58½	...	...
Potassium Abietate, bbls lb.	...	.13	...	...	...	...
Acetate lb.	.26	.28	.26	.28	.26	.28
Bicarbonate, USP, 320 lb bbls lb.	.09	.18	.09	.18	.09	.18
Bichromate Crystals, 725 lb cks* lb.	.08½	.09	.08½	.09	.08½	.09
Binoxalate, 300 lb bbls. lb.	...	.23	...	.23	...	.23
Bisulfate, 100 lb kgs lb.	.15½	.18	.15½	.18	.15½	.18
Carbonate, 80-85% calc 800 lb cks lb.	.06½	.07	.06½	.07	.06½	.07½
liquid, tks lb.	...	.02¾	...	.02¾	.02¾	.02⅞
drs, wks lb.	.02⅞	.03½	.02⅞	.03½	.02⅞	.03¼
Chlorate crys, 112 lb kgs, wks lb.	.09¼	.09½	.09¼	.09½	.09¼	.09½
gran, kgs lb.	.12	.13	.12	.13	.12	.13
powd, kgs lb.	.08½	.08¾	.08½	.08¾	.08	.08¼
Chloride, crys, bbls lb.	.04	.04¾	.04	.04¾	.04	.04¾
Chromate, kgs lb.	.28	.29	.28	.29	.23	.28
Cyanide, 110 lb cases lb.	.55	.57½	.55	.57½	.55	.57½
Iodide, 75 lb bbls lb.	.93	1.00	.93	1.15	1.10	1.25
Metabisulfite, 300 lb bbls lb.	.11	.12	.11	.15	.13¾	.15
Muriate, bgs, dom, blk unit	...	.53½	.50	.53½	.45	.50
Oxalate, bbls lb.	.25	.26	.25	.26	.25	.26
Perchlorate, kgs, wks lb.	.09	.11	.09	.11	.09	.11
Permanganate, USP, crys, 500 & 1000 lb drs, wks lb.	.18½	.19½	.18½	.19½	.18½	.19½
Prussiate, red, bbls lb.	.35	.37	.35	.37	.35	.38½
Yellow, bbls lb.	.15	.16	.15	.18	.16	.19
Sulfate, 90% basis, bgs ton	...	36.25	...	36.25	33.75	36.25
Titanium Oxalate, 200 lb bbls lb.	.33	.35	.33	.35	.32	.35
Pot & Mag Sulfate, 48% basis bgs ton	...	25.75	24.75	25.75	22.25	24.75
Propane, group 3, tks lb.	.03	.04⅛	.03	.04⅛	.03	.04⅛
Putty, coml, tubs 100 lb.	...	2.90	2.90	3.00	2.75	3.00
Linseed Oil, kgs 100 lb.	...	4.65	4.65	4.75	4.50	4.75
Pyrethrum, conc liq:						
2.4% pyretherins, drs, frt allowed gal.	5.00	5.25	4.15	5.25	...	...
3.6% pyretherins, drs, frt allowed gal.	7.75	7.85	6.10	7.85	...	...
Flowers, coarse, Japan, bgs lb.	...	.14¾	.12¾	.14¾	...	...
Fine powd, bbls lb.	...	.17¾	.14	.17¾	...	...
Pyridine, denat, 50 gal drs gal.	...	1.55	1.30	1.55	...	1.30
Pyrites, Spanish cif Atlantic ports, blk unit	.12	.13	.12	.13	.12	.13
Pyrocatechin, CP, drs, tins lb.	2.15	2.75	2.15	2.75	2.15	2.75
Quebracho, 35% liq tks lb.	...	.03	.02⅞	.03	.02½	.02⅞
450 lb bbls, c-l lb.	...	.03½	.03½	.03⅞	.03⅝	.03⅞
Solid, 63%, 100 lb bales cif lb.	...	.04	.03⅞	.04	.03½	.03⅞
Clarified, 64%, bales lb.	...	.04¼	.04¼	.04⅜	.03⅞	.04⅜
Quercitron, 51 deg liq, 450 lb bbls lb.	.06	.06½	.06	.06½	.06	.06½
Solid, drs lb.	.10	.12	.10	.12	.10	.12
R SALT						
R Salt, 250 lb bbls, wks lb.	.52	.55	.52	.55	.52	.57
Resorcinol tech, cans lb.	.75	.80	.75	.80	.75	.80
Rochelle Salt, cryst lb.	.15	.15½	.14½	.15½	.14	.15
Powd, bbls lb.	.16	.16½	.13½	.16½	.13	.14
Rosin Oil, bbls, first run gal.	.58	.60	.58	.73	.38	.71
Second run gal.	.60	.62	.60	.75	.43	.73
Third run, drs gal.	.64	.66	.64	.79	.49	.77

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Rosins
Sodium Nitrate

Prices

		Current Market	1937 Low	1937 High	1936 Low	1936 High
Rosins 600 lb bbls, 280 lb unit ex. yard NY:†						
B	...	8.75	8.30	10.00	4.45	10.95
D	...	8.75	8.35	10.35	4.95	10.95
E	...	8.75	8.80	10.25	5.15	10.95
F	...	9.00	9.05	10.80	5.40	10.95
G	...	9.00	9.05	10.85	5.50	10.95
H	...	9.00	9.00	10.85	5.60	10.95
I	...	9.00	9.00	10.90	5.70	10.95
K	...	9.00	9.00	10.90	5.55	10.95
M	...	9.00	9.00	11.00	5.60	10.95
N	...	9.15	9.10	11.05	5.70	11.00
WG	...	9.40	9.15	11.75	5.85	11.00
WW	...	9.85	9.85	13.75	5.90	12.05
Rosins, Gum, Savannah (280 lb unit):†						
B	...	7.50	7.05	8.75	3.15	9.70
D	...	7.50	7.10	9.00	3.75	9.70
E	...	7.50	7.55	9.10	3.90	9.70
F	...	7.85	7.80	9.55	4.10	9.70
G	...	7.85	7.80	9.60	4.20	9.70
H	...	7.85	7.80	9.60	4.30	9.70
I	...	7.85	7.80	9.65	4.35	9.70
K	...	7.85	7.80	9.65	4.30	9.70
M	...	7.85	7.80	9.75	4.35	9.70
N	...	7.90	7.85	9.75	4.45	9.75
WG	...	8.15	7.90	10.50	4.45	9.75
WW	...	8.60	8.60	12.50	4.55	10.80
X	...	8.60	8.60	12.50	4.55	10.80
Rosin, Wood, c-l, FF grade, NY	8.70	9.65	8.56	10.72	6.10	10.52
Rotten Stone, bgs mines..ton	...	**35.00**	...	**35.00**	...	**35.00**
Imported, lump, bbls ...lb.	...	**.12**	...	...	...	...
Powdered, bbls .....lb.	.08½	**.10**	...	...	...	...
SAGO FLOUR						
Sago Flour, 150 lb bgs ...lb.	.03¼	.03¾	.02¾	.03¾	.02¾	.03¾
Sal Soda, bbls, wks ...100 lb.	...	**1.15**	...	**1.15**	**1.15**	**1.30**
Salt Cake, 94-96%, c-l, wks ton	19.00	**23.00**	19.00	**23.00**	19.00	**23.00**
Chrome, c-l, wks .....ton	11.00	**12.00**	11.00	**12.00**	11.00	**13.00**
Saltpetre, gran, 450-500 lb bbls .....lb.	.06	.064	.06	.064	.059	.06¼
Cryst, bbls .....lb.	.07	.074	.07	.074	.069	.08
Powd, bbls .....lb.	.07	.074	.07	.074	.069	.07¾
Satin, White, 550 lb bbls..lb.	...	**.01½**	...	**.01½**	...	**.01½**
Schaeffer's Salt, kgs .....lb.	.46	.48	.46	.48	.46	**.50**
Shellac, Bone dry, bbls..lb. *r*	.17½	.18	.17½	.22	.17½	.26½
Garnet, bgs .....lb.	.14	.15	.14	.17	.16	.20
Superfine, bgs .....lb. *s*	.13½	.14	.13½	.18½	.14½	.18½
T. N., bgs .....lb. *s*	.12½	.13	.12½	.14½	.13½	.16
Silver Nitrate, vials .....oz.	.32⅞	.34⅞	.32⅝	.35½	.32½	.34⅞
Slate Flour, bgs, wks ....ton	9.00	10.00	9.00	10.00	9.00	10.00
Soda Ash, 58% dense, bgs, c-l, wks .....100 lb.	...	**1.25**	...	**1.25**	...	**1.25**
58% light, bgs .....100 lb.	...	**1.23**	...	**1.23**	...	**1.23**
blk .....100 lb.	...	**1.05**	...	**1.05**	...	**1.05**
paper bgs .....100 lb.	...	**1.20**	...	**1.20**	...	**1.20**
bbls .....100 lb.	...	**1.50**	...	**1.50**	...	**1.50**
Caustic, 76% grnd & flake, drs .....100 lb.	...	**3.00**	...	**3.00**	...	**3.00**
76% solid, drs .....100 lb.	...	**2.60**	...	**2.60**	...	**2.60**
Liquid sellers, tks ..100 lb.	...	**2.25**	...	**2.25**	...	**2.25**
Sodium Abietate, drs .....lb.	...	**.13**	**.08**	**.13**	...	**.08**
Acetate, tech, 450 lb bbls, wks .....lb.	.04¼	.05	.04¼	.05	.04½	.05
Alignate, drs .....lb.	...	.69	.64	.69	...	.64
Antimoniate, bbls .....lb.	.14¾	.15¼	.13¾	.16¼	.12	.14
Arsenate, drs .....lb.	.08	.08½	.08	.11½	...	.10½
Arsenite, liq, drs .....gal.	.30	.33	.33	.40	.40	.75
Benzoate, USP, kgs ....lb.	.46	.48	.46	.48	.46	**.48**
Bicarb, 400 lb bbl, wks 100 lb.	...	**1.75**	...	**1.75**	**1.75**	**1.85**
Bichromate, 500 lb cks, wks* .....lb.	.06½	.07	.06½	.07	.06½	.07
Bisulfite, 500 lb bbl, wks lb.	.03¼	.036	.03¼	.036	.03¼	.036
35-40% sol bbls, wks 100 lb.	1.40	1.80	...	...	...	...
Chlorate, bgs, wks .....lb.	.06¼	.07½	.06¼	.07½	.06¼	.07½
Cyanide, 96-98%, 100 & 250 lb drs, wks .....lb.	.16½	.17½	.15½	.17½	.15½	.17½
Fluoride, 90%, 300 lb bbls, wks .....lb.	.07½	.08¼	.07½	.08¼	.07¼	.08¼
Hydrosulfite, 200 lb bbls, f.o.b. wks .....lb.	.16	.17	.16	.17	.17	.19
Hyposulfite, tech, pea crys 375 lb bbls, wks 100 lb.	2.50	3.00	2.50	3.00	2.50	3.00
Tech, reg cryst, 375 lb bbls, wks .....100 lb.	2.40	2.75	2.40	2.75	2.40	2.75
Iodide .....lb.	1.90	1.95	1.90	1.95	1.90	2.05
Metal, drs, 280 lbs .....lb.	...	.19	...	.19	...	...
Metanilate, 150 lb bbls..lb.	.41	.42	.41	.42	.41	.42
Metasilicate, gran, c-l, wks .....100 lb.	...	**2.15**	...	2.15	2.15	3.00
cryst, bbls, c-l, wks 100 lb.	...	**2.75**	...	**2.75**	**2.75**	3.25
Monohydrate, bbls .....lb.	...	.023	...	.023	...	.023
Naphthenate, drs .....lb.	.12	.19	.09	.19	...	.09
Naphthionate, 300 lb bbl lb.	.52	.54	.52	.54	.52	.54
Nitrate, 92%, crude, 200 lb bgs, c-l, NY .....ton	...	28.30	26.80	28.30	24.80	26.80
100 lb bgs .....ton	...	29.00	27.50	29.00	25.50	27.50
Bulk .....ton	...	27.00	25.50	27.00	23.50	25.50

r Bone dry prices at Chicago 1c higher; Boston ½c; Pacific Coast 3c; Philadelphia deliveries f.o.b. N. Y.; refined 6c higher in each case; *s* T. N. and Superfine prices quoted f.o.b. N. Y. and Boston; Chicago prices 1c higher; Pacific Coast 3c; Philadelphia f.o.b. N. Y. * Spot price is ⅛c higher; † Closing prices Sept. 24th.

	Current Market	1937 Low	1937 High	1936 Low	1936 High
Sodium (continued):					
Nitrite, 500 lb bbls ... lb.	.07	.10	.07	.10	.07	.08
Orthochlorotoluene, sulfonate, 175 lb bbls, wks .. lb.	.25	.27	.25	.27	.25	.27
Perborate, drs, 400 lbs .. lb.	.14¾	.15¼	.14¾	.15¼	.14¾	.18
Peroxide, bbls, 400 lb ... lb.	...	.17	...	.17	...	.17
Phosphate, di-sodium, tech, 310 lb bbls, wks 100 lb.	...	1.90	...	1.90	1.95	2.30
bgs, wks ... 100 lb.	...	1.70	...	1.70	1.75	2.10
Tri-sodium, tech, 325 lb bbls, wks ... 100 lb.	...	2.05	...	2.05	1.95	2.30
bgs, wks ... 100 lb.	...	1.85	...	1.85	1.75	2.10
Picramate, 160 lb kgs ... lb.	.65	.67	.65	.67	.65	.69
Prussiate, Yellow, 350 lb bbl, wks ... lb.	.10	.11½	.10	.11½	.10	.12
Pyrophosphate, anhyd, 100 lb bbls ... lb.	...	.10	...	.10	.10	.132
Sesquisilicate, drs, c-l, wks ... 100 lbs.	...	3.00	...	...	...	...
Silicate, 60°, 55 gal drs, wks ... 100 lb.	1.65	1.70	1.65	1.70	1.65	1.70
40°, 35 gal drs, wks 100 lb.	...	.80	...	.80	...	.80
tks, wks ... 100 lb.	...	.65	...	.65	...	.65
Silicofluoride, 450 lb bbls NY ... lb.	.05¾	.06½	.05¾	.07	.05¼	.07¼
Stannate, 100 lb drs ... lb.	.37	.40	.33	.44	.28½	.37½
Stearate, bbls ... lb.	...	.24	.19	.24	.20	.26
Sulfanilate, 400 lb bbls .. lb.	.16	.18	.16	.18	.16	.18
Sulfate Anhyd, 550 lb bgs* c-l, wks ... 100 lb. ‡	1.45	1.90	1.45	1.90	1.30	1.90
Sulfide, 80% cryst, 440 lb bbls, wks ... lb.	...	.02¼	...	.02¼	...	.02¼
62% solid, 650 lb drs, c-l, wks ... lb.	...	.02	...	.02	...	.03
Sulfite, cryst, 400 lb bbls, wks ... lb.	.023	.02½	.023	.02½	.023	.02½
Sulfocyanide, drs ... lb.	.28	.47	.28	.47	.28	.47
Sulforicinoleate, bbls ... lb.	...	.12	...	.12	...	...
Tungstate, tech, crys, kgs lb.	...	nom.	.85	.90	.85	.90
Sorbitol, com., drs, basis content, wks ... lb.	...	.25	...	.25	...	...
Spruce Extract, ord, tks ... lb.	...	.01⅛	.01	.01⅛	...	.01
Ordinary, bbls ... lb.	...	.01⅝	.01½	.01⅝	...	.01½
Super spruce ext, tks ... lb.	...	.01⅜	.01⅜	.01⅝	...	.01⅝
Super spruce ext, bbls .. lb.	...	.01⅞	...	.01⅞	...	.01⅞
Super spruce ext, powd, bgs ... lb.	...	.04	.04	.04¼	...	.04
Starch, Pearl, 140 lb bgs 100 lb.	3.78	3.98	3.78	4.53	2.99	4.30
Powd, 140 lb bgs ... 100 lb.	3.88	4.08	3.88	4.63	3.90	4.54
Potato, 200 lb bgs ... lb.	...	.05½	.04½	.05½	.04½	.05½
Imp, bgs ... lb.	.05½	.06	.05	.06	.05	.06
Rice, 200 lb bbls ... lb.	...	.07¼	...	.07¼	...	.07¼
Wheat, thick, bgs ... lb.	.07	.08½	.07	.08½	.08¼	.08½
Strontium carbonate, 600 lb bbls, wks ... lb.	.07¼	.07½	.07¼	.07½	.07¼	.07½
Nitrate, 600 lb bbls, NY lb.	.07¾	.08¾	.07¾	.08¾	.08¾	.09½
Sucrose octa-acetate, den, grd, bbls, wks ... lb.	.45	...	.45	...	.45	...
tech, bbls, wks ... lb.	.40	...	.40	...	.40	...
Sulfur, crude, f.o.b. mines, ton	18.00	19.00	18.00	19.00	18.00	19.00
Flour, coml, bgs ... 100 lb.	1.65	2.35	1.65	2.35	1.60	2.35
bbls ... 100 lb.	1.95	2.70	1.95	2.70	1.95	2.70
Rubbermakers, bgs .. 100 lb.	2.20	2.80	2.20	2.80	2.20	2.80
bbls ... 100 lb.	2.55	3.15	2.55	3.15	2.55	3.15
Extra fine, bgs ... 100 lb.	2.85	3.00	2.85	3.00	2.40	3.00
Superfine, bgs ... 100 lb.	2.65	2.80	2.65	2.80	2.20	2.80
bbls ... 100 lb.	2.25	3.10	2.25	3.10	2.25	3.10
Flowers, bgs ... 100 lb.	3.00	3.75	3.00	3.75	3.00	3.75
bbls ... 100 lb.	3.35	4.10	3.35	4.10	3.35	4.10
Roll, bgs ... 100 lb.	2.35	3.10	2.35	3.10	2.35	3.10
bbls ... 100 lb.	2.50	3.25	2.50	3.25	2.50	3.25
Sulfur Chloride, 700 lb drs, wks ... lb.	.03	.04	.02½	.04	...	...
Sulfur Dioxide, 150 lb cyl lb.	.07	.09	.07	.09	.06½	.08½
Multiple units, wks ... lb.	.04½	.07	.04½	.07	.05½	.06
tks, wks ... lb.	.04	.05	.04	.05	.04½	.04¾
Refrigeration, cyl, wks .. lb.	.16	.17	.15	.17	.10	.13
Multiple units, wks ... lb.	.07½	.10	.07½	.10	.07	.09¼
Sulfuryl Chloride ... lb.	.15	.40	.15	.40	.15	.40
Sumac, Italian, grd ... ton	...	60.00	58.50	65.00	52.00	60.00
Extract, 42°, bbls ... lb.	.05¼	.06¼	.05¼	.06¼	...	...
Superphosphate, 16% bulk, wks ... ton	...	9.00	8.25	9.00	...	...
Run of pile ... ton	...	8.50	8.00	8.50	...	...
Triple, 44-45%, a. p. a. bulk, wks, Balt. unit ... ton	...	.85	.70	.85	...	...
Talc, Crude, 100 lb bgs, NY ton	13.00	15.00	13.00	15.00	13.00	15.00
Ref'd, 100 lb bgs, NY ton	14.00	16.00	14.00	16.00	14.00	18.00
French, 220 lb bgs, NY ton	23.00	30.00	23.00	30.00	22.00	30.00
Ref'd, white, bgs, NY ton	45.00	60.00	45.00	60.00	45.00	60.00
Italian, 220 lb bgs to arr ton	60.00	62.00	60.00	62.00	60.00	75.00
Ref'd, white, bgs, NY ton	65.00	70.00	65.00	70.00	65.00	80.00
Tankage Grd, NY ... unit ‰	...	3.40	3.40	4.40	2.65	4.25
Ungrd ... unit ‰	...	3.25	3.25	4.35	2.40	4.25
Fert grade, f.o.b. Chgo unit ‰	...	2.75	2.75	4.00	2.40	4.00
South American cif unit ‰	...	3.50	3.50	4.25	2.70	3.90
Tapioca Flour, high grade, bgs ... lb.	.03¼	.05½	.03¼	.05½	.03½	.05½
Tar Acid Oil, 15%, drs .. gal.	.22½	.25½	.21	.25½	.21	.24
25%, drs ... gal.	.26½	.29½	.24½	.29½	.24	.27½
Tar, pine, delv, drs ... gal.	...	.26	...	.26	.25	.26
tks, delv, E. cities ... gal.	...	.20	...	.20	...	.20
Tartar Emetic, tech, bbls .. lb.	.26¾	.27	.24¾	.27	.24¾	.25
USP, bbls ... lb.	.32	.32½	.30	.32½	.28	.30½
Terpineol, den grd, drs ... lb.	.13¾	.14¾	.13¾	.14¾	.13¾	.14¾
tks ... lb.	.13	.14	.13	.14	.13	.14

‡ Bags 15c lower; ‰ + 10; * Bbls. are 20c higher.

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Tetrachlorethane
Zinc Stearate

Prices

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Tetrachlorethane, 650 lb drs lb.	.08	.08½	.08	.08½	.08	.08½
Tetrachloroethylene, drs, tech lb.	...	.10½	...	.10½	...	...
Tetralene, 50 gal drs, wks lb.	.12	.13	.12	.13	.12	.13
Thiocarbanilid, 170 lb bbl lb.	.20	.25	.20	.25	.20	.25
Tin, crystals, 500 lb bbls, wks lb.	.42	.42½	.37½	.46	.35	.39½
Metal, NY lb.	...	.58	.49⅜	.66	.40½	.52½
Oxide, 300 lb bbls, wks lb.	.60	.62	.55	.62	.47	.57
Tetrachloride, 100 lb drs, wks lb.	...	.29½	.25½	.32	.21¼	.26¾
Titanium Dioxide, 300 lb bbls lb.	.16¼	.17	.16¼	.17	.16¼	.19¼
Barium Pigment, bbls lb.	.06⅛	.06⅜	.06	.06⅜	.05¾	.06½
Calcium Pigment, bbls lb.	.06⅛	.06⅜	.06	.06⅜	.05¾	.06½
Toluidine, mixed, 900 lb drs, wks lb.	.26	.27	.26	.27	.27	.28
Toluol, 110 gal drs, wks gal.	...	.35	...	.35	...	.35
8000 gal tks, frt allowed gal.	...	.30	...	.30	...	.30
Toner Lithol, red, bbls lb.	.75	.80	.75	.80	.75	.80
Para, red, bbls lb.	...	.75	...	.75	...	.75
Toluidine, bgs lb.	...	1.35	...	1.35	...	1.35
Triacetin, 50 gal drs, wks lb.	...	.36	...	.36	.32	.36
Triamyl Borate, lcl, drs, wks lb.	...	.27	...	.27	...	...
Triamylamine, c-l, drs, wks lb.	.77	1.25	.77	1.25	...	1.25
Tributyl citrate, drs, frt all'd lb.	...	.45	...	.45	...	...
Tributyl Phosphate, frt all'd lb.	...	.50	...	.50	...	...
Trichlorethylene, 600 lb drs, frt allowed E. Rocky Mts lb.	.089	.094	.089	.094	.089	.094
Tricresyl phosphate, tech, drs lb.	...	.26½	.22½	.26½	.19	.26
Triethanolamine, 50 gal drs wks lb.	.21	.22	.21	.30	.26	.30
tks, wks lb.	...	.20	.20	.25	...	.25
Triethylene glycol, drs, wks lb.	...	.26	...	...	...	...
Trihydroxyethylamine Oleate, bbls lb.	...	.30	...	...	...	...
Stearate, bbls lb.	...	.30	...	...	...	...
Trimethylamine, c-l, drs, frt allowed E. Mississippi lb.	...	1.00	...	1.00	...	...
Triphenylguanidine lb.	.58	.60	.58	.60	.58	.60
Triphenyl Phosphate, drs lb.	.34	.36	...	...	...	...
Tripoli, airfloated, bgs, wks ton	25.00	30.00	25.00	30.00	27.50	30.00
Turpentine (Spirits), c-l, NY dock, bbls gal.	...	.35½	.35½	.47	.40½	.50
Savannah, bbls gal.	...	.30	.30	.42	.35½	.45
Jacksonville, bbls gal.	...	.27	.27	.41	.35¼	.44½
Wood Steam dist, bbls, c-l, NY gal.	...	.34	.34	.44	.38	.47
Wood, dest dist, c-l, drs gal.	...	.36	...	...	...	...
Urea, pure, 112 lb cases lb.	.14½	.15½	.14½	.15½	.14½	.17
Fert grade, bgs, c.i.f. ton						
c.i.f. S.A. points ton	95.00	110.00	95.00	110.00	95.00	110.00
Dom, f.o.b., wks ton	95.00	101.00	95.00	101.00	95.00	110.00
Urea Ammonia liq 55% NH_3, tks unit	No prices		1.00	1.04	...	.96
Valonia beard, 42%, tannin bgs ton	...	49.00	35.00	49.00	46.00	64.50
Cups, 32% tannin, bgs ton	32.50	34.50	31.50	36.00	34.00	42.00
Vanilin, ex eugenol, 25 lb tins, 2000 lb lots lb.	...	3.65	...	3.65	3.65	3.75
Ex-guaiacol lb.	...	3.55	...	3.55	3.55	3.65
Vermillion, English, kgs lb.	...	1.75	1.72	1.90	1.52	1.85
Wattle Bark, bgs ton	41.75	43.75	31.00	43.75	26.50	32.00
Extract, 60°, tks, bbls lb.	...	.04⅝	.03⅝	.04⅝	...	.03⅝
WAXES						
Wax, Bayberry, bgs lb.	.16⅞	.17	.16½	.17½	.16½	.20
Bees, bleached, white 500 lb slabs, cases lb.	.39	.45	.38	.45	.34	.40
Yellow, African, bgs lb.	.27	.28	.27	.30	.24	.27
Brazilian, bgs lb.	.30	.32	.30	.34	.25	.29½
Chilean, bgs lb.	.30	.32	.30	.34	.25	.29½
Refined, 500 lb slabs, cases lb.	.35	.39	.29½	.39	.28	.32
Candelilla, bgs lb.	.13	.14	.13	.16½	.14	.17½
Carnauba, No. 1, yellow, bgs lb.	.47	.48½	.45	.49	.43½	.48
No. 2, yellow, bgs lb.	.45½	.46	.43½	.46½	.42	.46
No. 2, N. C., bgs lb.	.40	.40½	.38	.43	.38	.40
No. 3, Chalky, bgs lb.	.37	.38½	.34½	.40	.33½	.38
No. 3, N. C., bgs lb.	.37	.38½	.35	.43	.34	.41
Ceresin, dom, bgs lb.	.08½	.12	.08	.12	.08	.11
Japan, 224 lb cases lb.	.11	.11¼	.09½	.11¼	.08	.10½
Montan, crude, bgs lb.	.11	.12	.11	.12	.10¾	.11¾
Paraffin, see Paraffin Wax.						
Spermaceti, blocks, cases lb.	.23	.24	.23	.24	.22	.24
Cakes, cases lb.	.24	.25	.24	.25	.23	.25
Whiting, chalk, com, 200 lb bgs c-l, wks ton	12.00	14.00	12.00	14.00	...	15.00
Gilders, bgs, c-l, wks ton	...	15.00	...	15.00	11.50	15.00
Wood Flour, c-l, bgs ton	20.00	30.00	18.00	30.00	18.00	30.00
Xylol, frt allowed, East 10° tks, wks gal.	...	.33	...	.33	...	.33
Coml, tks, wks, frt all'd gal.	...	.30	...	.30	...	.30
Xylidine, mixed crude, drs lb.	.35	.36	.35	.36	.36	.37
Zinc, Carbonate tech, bbls, NY lb.	.14	.15	.12	.15	.09	.11
Chloride fused, 600 lb drs, wks lb.	.04½	.046	.04½	.046	.04½	.05¾
Gran, 500 lb drs, wks lb.	.05	.05¾	.05	.05¾	.05	.05¾
Soln 50%, tks, wks 100 lb.	...	2.25	2.00	2.25	...	2.00
Cyanide, 100 lb drs lb.	.36	.38	.36	.38	.36	.38
Zinc dust, 500 lb bbls, c-l, delv lb.	...	.0915	.079	.094	.068	.0755
Metal, high grade slabs, c-l, NY 100 lb.	...	7.60	6.35	7.85	...	5.825
E. St. Louis 100 lb.	...	7.25	6.00	7.50	4.80	5.45
Oxide, Amer, bgs, wks lb.	.06¼	.07¾	.05¼	.07¾	.05	.05½
French, 300 lb bbls, wks lb.	.06¼	.07¾	.05½	.07¾	.05½	.07
Palmitate, bbls lb.	.23	.25	.23	.25	.22	.23
Resinate, fused, pale, bbls lb.	...	.10	.09	.10	.05¾	.10
Stearate, 50 lb bbls lb.	.20	.23	.20	.23	.19	.23

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Zinc Sulfate, crys, 400 lb bbl, wks ..... lb.	...	.033	.028	.033	.028	.033
Flake, bbls ..... lb.	...	.0375	.032	.0375	.032	.035
Sulfide, 500 lb bbls, delv lb.	.09¼	.09¾	.09¼	.09¾	.09¼	.11¾
bgs, delv ..... lb.	.09	.09½	.09	.09½	.09	.11½
Sulfocarbolate, 100 lb kgs ..... lb.	.24	.26	.24	.26	.24	.25
Zirconium Oxide, crude, 73-75% grd, bbls, wks ..... ton	75.00	100.00	...	...	...	...
kgs, wks ..... lb.	.04¼	.04½	...	...	...	...

Oils and Fats

Babassu, tks, futures ..... lb.	.07½	.08	.07½	.11¼	...	...
Castor, No. 3, 400 lb bbls .. lb.	.10⅛	.10¼	.10¼	.10¾	.10¼	.10¾
Blown, 400 lb bbls ..... lb.	.12¼	.13	.12¼	.13	.12¼	.13
China Wood, drs, spot NY lb.	.23	nom.	.12½	.23	.13	.19¼
Tks, spot NY ..... lb.	.23	nom.	.118	.23	.125	.19
Coast, tks ..... lb.	.23	nom.	.133	.23	.127	.18
Coconut, edible, bbls NY .. lb.	.10¼	.10½	.10	.15	.09¼	.14¼
Manila, tks, NY ..... lb.	.04⅝	.04¾	.05¼	.09½	.04⅛	.07
Tks, Pacific Coast .... lb.	...	.04⅜	.04¼	.08⅜	.03⅞	.08½
Cod, Newfoundland, 50 gal bbls ..... gal.	.52	nom.	.51	.52	.40	.48½
Copra, bgs, NY ..... lb.	.0265	.0270	.0260	.055	.0320	.0535
Corn, crude, tks, mills .... lb.	...	.06¾	.06¾	.10¾	.08	.10½
Refd, 375 lb bbls, NY .. lb.	.10	.10¼	.10	.13¼	.10¾	.13
Degras, American, 50 gal bbls. NY ..... lb.	...	.07¾	.07¾	.08¼	.05¼	.08
English, bbls, NY ..... lb.	...	.07¾	.07¾	.08¼	.04	.08
Greases, Yellow ..... lb.	.06⅝	.06⅞	.06⅝	.09	.03⅜	.08¼
White, choice bbls, NY .. lb.	.07½	.08⅛	.07½	.10¼	.04⅛	.08¾
Herring, Coast, tks ..... gal.	...	nom.	...	nom.	...	.31
Lard Oil, edible, prime ... lb.	...	.15	.14¾	.16¾	.12¾	.16¼
Extra, bbls ..... lb.	...	.12¾	.12¾	.13½	.09½	.13
Extra, No. 1, bbls ..... lb.	...	.11	.11	.13½	.07¾	.12¼
Linseed, Raw less than 5 bbl lots ..... lb.	...	.118	.107	.121	.104	.117
bbls, c-l, spot ..... lb.	...	.11	.099	.113	.096	.103
Tks ..... lb.	...	.104	.093	.107	.086	.097
Menhaden, tks, Baltimore gal.	.35	nom.	.35	.45	.25	.36
Refined, alkali, drs ..... lb.	...	.08	.08	.10	.066	.084
Tks ..... lb.	...	.074	.074	.09	.062	.078
Kettle bodied, drs ..... lb.	...	.09	.09	.11	.08	.096
Light pressed, drs ..... lb.	...	.074	.074	.094	.06	.078
Tks ..... lb.	...	.067	.067	.084	.056	.072
Neatsfoot, CT, 20°, bbls, NY ..... lb.	...	.17¾	.17¼	.18¼	.16	.17
Extra, bbls, NY ..... lb.	...	.11¼	.11¼	.13¾	.08	.12½
Pure, bbls, NY ..... lb.	...	.12¾	.12¾	.14¼	.11½	.12¾
Oiticica, bbls ..... lb.	.17	nom.	.10⅞	.17	.10	.15½
Oleo, No. 1, bbls, NY .... lb.	...	.13	.12⅜	.14½	.09¼	.14
No. 2, bbls, NY ..... lb.	...	.12¼	.11⅞	.14	.08¾	.13½
Olive, denat, bbls, NY ... gal.	1.30	nom.	1.30	1.65	.73	1.60
Edible, bbls, NY ..... gal.	2.40	nom.	2.20	2.50	1.60	2.25
Foots, bbls, NY ..... lb.	.10¾	nom.	.10¾	.12½	.08	.10⅜
Palm, Kernel, bulk ..... lb.	...	.04¾	.04¾	.08⅛	.04¾	.083
Niger, cks ..... lb.	...	.04¾	.04¾	.07¼	.04	.06½
Sumatra, tks ..... lb.	...	.04	.04	.06½	.03¾	.06½
Peanut, crude, bbls, NY .. lb.	.06¾	nom.	.06¼	.10⅝	.08	.10½
Tks, f.o.b. mill ..... lb.	.06½	nom.	.06½	.10¼	.17¾	.10⅜
Refined, bbls, NY ..... lb.	.10½	nom.	.10½	.13½	.12	.13¼
Perilla, drs, NY ..... lb.	...	.13½	.11	.13½	.07	.11¾
Tks, Coast ..... lb.	...	.13	.105	.13	.066	.11¼
Pine, see Pine Oil, Chemical Section.						
Rapeseed, blown, bbls, NY lb.	.14¼	.14½	.13	.14½	.086	.13½
Denatured, drs, NY ... gal.	.95	.96	.85	.97	.52	.85
Red, Distilled, bbls ..... lb.	.10⅞	.11⅞	.10⅞	.12⅝	.08⅝	.11⅝
Tks ..... lb.	...	.10	.10	.10¾	.07¾	.09¾
Salmon, Coast, 8000 gal tks ..... gal.	...	nom.	...	nom.	.31	.32½
Sardine, Pac Coast, tks .. gal.	...	.36	.36	.55	.28	.47
Refined alkali, drs ..... lb.	...	.08	.08	.10	.066	.084
Tks ..... lb.	...	.074	.074	.09	.062	.078
Light pressed, drs ..... lb.	...	.074	.074	.094	.06	.078
Tks ..... lb.	...	.067	.067	.084	.056	.072
Sesame, yellow, dom ..... lb.	.10¾	nom.	.10¾	.13¼	.12¾	.14½
White, dos ..... lb.	.10¾	nom.	.10¾	.13¼	.12¾	.14½
Soy Bean, crude Dom, tks, f.o.b. mills ... lb.	.07½	nom.	.07½	.10½	.07	.10½
Crude, drs, NY ..... lb.	.081	.085	.081	.11½	.076	.11½
Ref'd, drs, NY ..... lb.	.091	.095	.091	.12½	.081	.12½
Tks ..... lb.	...	.08½	.08½	.11½	.07½	.11½
Sperm, 38° CT, bleached, bbls NY ..... lb.	.10	.102	.096	.102	.094	.102
45° CT, bleached, bbls, NY ..... lb.	.093	.095	.089	.095	.087	.095
Stearic Acid, double pressed dist bgs ..... lb.	.12	.13	.12	.13½	.08½	.12½
Double pressed saponified bgs ..... lb.	.12¼	.13¼	.12¼	.13¾	.09	.12¾
Triple pressed dist bgs .. lb.	.15	.16	.15	.16½	.11¼	.15½
Stearine, Oleo, bbls ..... lb.	.08¾	.09	.08¾	.11½	.07¼	.12¼
Tallow City, extra loose .. lb.	...	.07⅜	.07⅜	.09¼	.04⅛	.08⅜
Edible, tierces ..... lb.	...	.08¼	.08¼	.10¼	.06¾	.09½
Acidless, tks, NY ..... lb.	...	.10¼	.10¼	.13	.07	.11¾
Turkey Red, single, bbls .. lb.	.08	.08½	.08	.08½	.08	.08½
Double, bbls ..... lb.	.12½	.13	.12½	.13	.12½	.13½
Whale: Winter bleach, bbls, NY lb.	.098	.10	.091	.111	.072	.087
Refined, net, bbls, NY .. lb.	.094	.096	.087	.107	.068	.083

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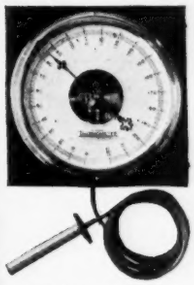

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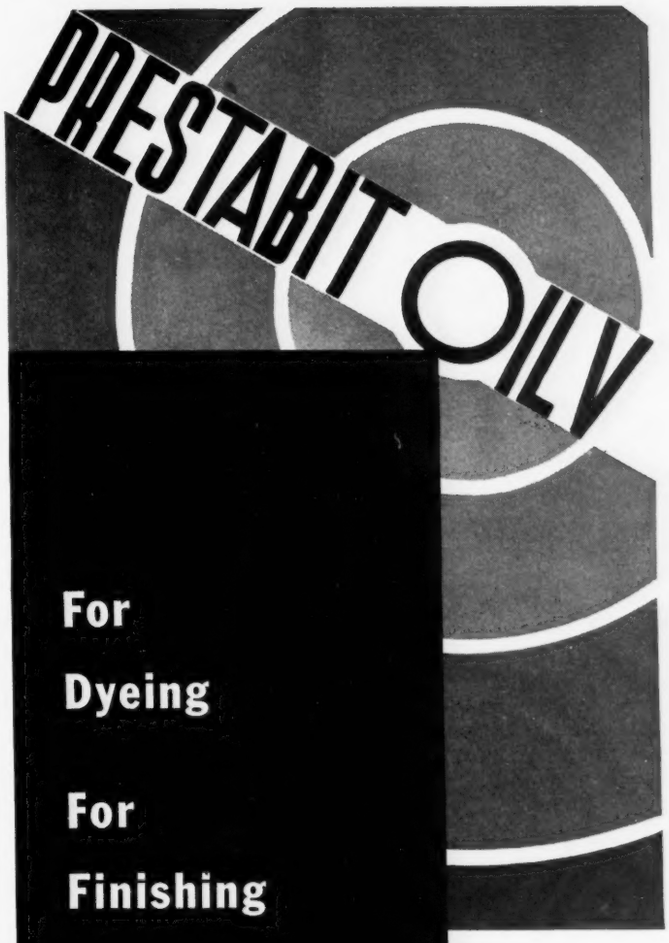

"We"—Editorially Speaking

Next year, Eaton-Clark, chemical distributors and makers of specialties, celebrate the one hundredth anniversary of their founding in Detroit. There are but few other firms in the chemical field that have an older record of independent operation under the same family interest. Wetherill & Brothers, white lead, founded in Philadelphia in 1762; W. H. & F. Jordan, coal tar, Philadelphia, 1778; du Pont in 1802; Bartlett & Brewer in Boston, now Brewer & Co., of Worcester, and Reynolds & Innis, now Innis, Speiden & Co., both in 1816. Bernard Douredoure, now Douredoure Brothers, Philadelphia, chemical brokers, 1822; J. Q. Dickinson, Malden, W. Va., bromine manufacturer, and the Davison Chemical Co., acids, of Baltimore, both 1832; in 1834, Pratt & King, now E. & F. King, chemical distributors, Boston; all these have passed the century mark in one line. Harrison, Lennig, Kalbfleisch, Powers, Weightman, and Rosengarten all have passed the century mark too, but these interests have merged with other companies.

❖❖❖❖

Among the great number of high tributes paid to the late Andrew Mellon, few have been more apt and graceful than that which is printed in the September issue of *Priorities*.

❖❖❖❖

It is fit and proper that Chandler's memory should be kept fresh with a series of distinguished scientific lectures, but he was a zestful, joyous man, and to have his friends gather at a good dinner at the Waldorf, on November 4, would appeal tremendously to his warm-hearted humanity.

❖❖❖❖

Vice President R. J. Moore of the American Institute of Chemists is a stout fellow. During the past summer, he has brought in more than one hundred new members to that estimable organization, which inspires us to paraphrase the popular chorus from "Pinafore:"

So in spite of all temptations,
To enjoy a salesman's rations
He remained a tech-nich-an.

"Three out of four steel workers"—blazes a three column steam head on the front page of *Steel Facts*, and we were fooled too. They have automobiles, not pink tooth brushes.

❖❖❖❖

Tops in chemical preparedness goes to Peru which has officially nationalized its helium industry—if and when any helium is discovered in Peru.

❖❖❖❖

Publishers of Lange's "Handbook of Chemistry" are smart fellows. They sent with their "review copy" the suggestion that the reviewer browse through the two thousand odd pages, ask the book questions and find the answers in the index, etc., etc., to find out just how valuable and useful it is. We took their advice, and were we surprised! We learned, right off the bat, that dictyosphaerium (which gives drinking water a nasturtium-like odor) are killed by 0.33 parts per million of copper sulfate. After that we gave up browsing and began asking questions, but could not find in the index either "Yanks" or "Giants," so we couldn't find out which club will win the World's Series pennant, which is what, at the moment, would be "most useful and usable data."

❖❖❖❖

What was the name of that schoolmaster from Gary, Indiana, who was laughed off the front page back in 1934 for saying the brain trusters were planning a radical change of the American system of government and that Franklin Roosevelt was simply playing the role of Kerensky in the revolution?

❖❖❖❖

One of our esteemed Consulting Editors writes to ask "whether we opine that the big place on the Rochester meeting program given to Fishbein means that the A.C.S. is either afraid of the A.M.A. or envious?" We give up—what's your guess?

❖❖❖❖

This has not been broadcast by any of the Washington correspondents but we have it on the highest authority that the President is writing a book of reminiscences—not to be sold by the Democratic National Committee—dedicated to "my best friend and severest critic"—not Eleanor, but Hugh.

❖❖❖❖

Since Louisiana has promised to cut their sulfur tax Freeport has announced a $300,000 expansion at their Louisiana mine, which will certainly increase the note of wistfulness we seem to recognize in the following editorial from the *St. Paul* (Minn.) *Dispatch*:

Louisiana is at the mouth of the Mississippi, Minnesota at the source, but their contrasts do not stop with geography. While Minnesota is sailing officially under a "soak business" banner, Louisiana is out to attract and encourage industry.

The latest example of the new Louisiana policy of using its tax laws to increase its industrial employment and wealth arises out of the state severance tax on sulfur. A year ago the tax was raised from 60 cents a ton to $2. Over in Texas the competitors of the Louisiana sulfur industry pay a tax of $1.03. The result has been that the output of sulfur in Louisiana dropped 23 per cent. while that of Texas increased 37 per cent., all since the tax boost.

Instead of violent speeches to denounce the "sulfur interests" the government of Louisiana prepares to get back on a competitive basis with Texas. The chairman of the State Board of Industry and Commerce, which was created for this precise purpose of encouraging industry in all possible ways, promises the sulfur industry that the tax will be revised at the next legislative session. The radicals who run Minnesota would scarcely know how to put such a letter together, it is so alien to their habit and inclination. But it would be a good thing for the state for them to try now and then.

Fifteen Years Ago

From our issues of October, 1922

John A. Chew, sales manager, Warner, elected Chairman N. Y. Chapter, Nat'l Ass'n Chemical Salesmen.

August Kochs, president, Victor Chemical, and J. V. N. Dorr return from Europe.

W. H. Fulweiler awarded Grasselli Medal by American Section, Society of Chemistry and Industry.

U. S. Industrial Alcohol leases fourteenth floor at 110 E. 42d St., New York City, for general offices.

John Lucas & Co., paint manufacturers, Phila., call special meeting to vote on proposed increase in capital stock.

Grasselli Chemical organizes pigment division with W. J. Lawson in charge of sales and distribution.

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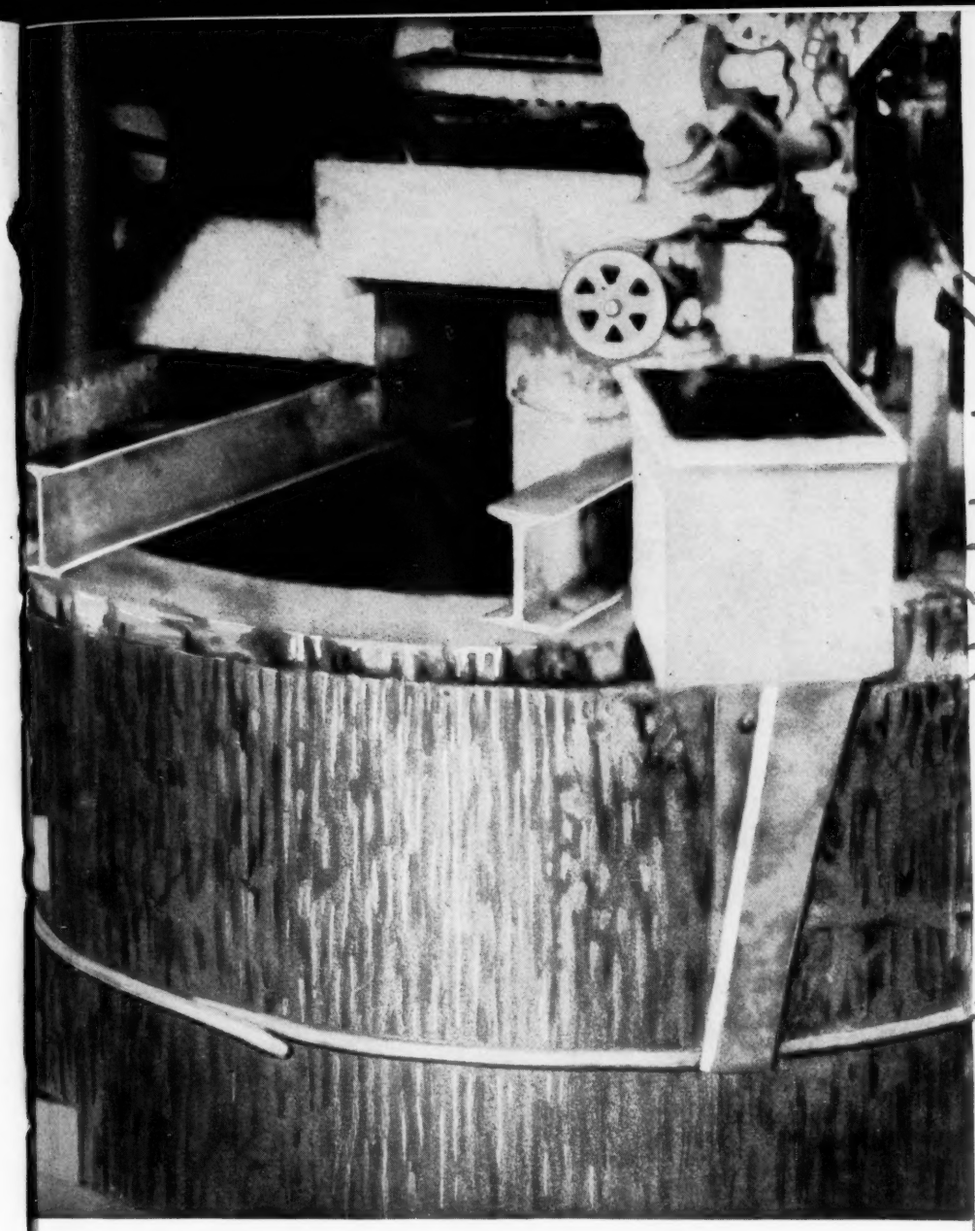

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